Electrical Review

Vol. 77—No. 11. CHICAGO, SATURDAY, SEPTEMBER 11, 1920. PAGE 389.

Cost Problems in the Lighting of Public Parks

Methods Used in Replacement of Old Arc-Lighting Equipment With Type C Lamps—Improved Conditions and Reductions in Cost Resulting from Change — Spectacular Features of Park Lighting

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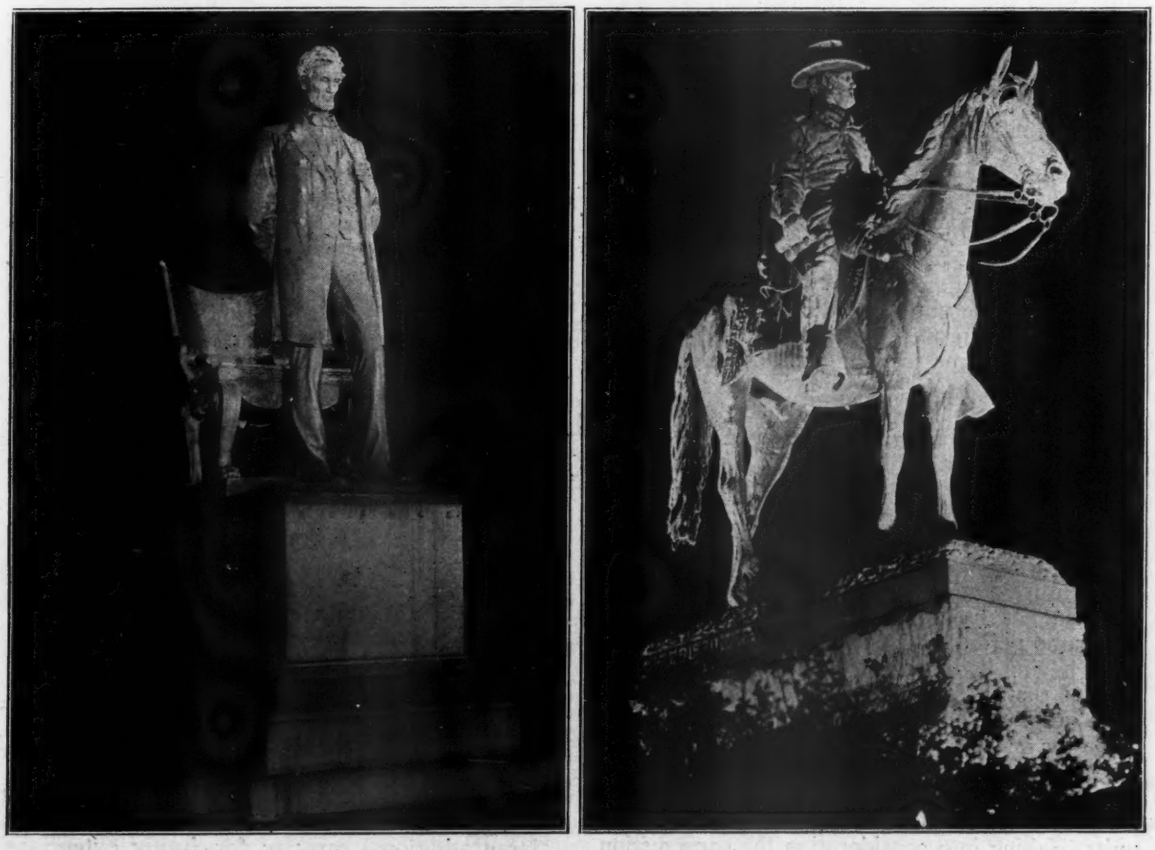
During the period of rising costs of labor and material, extending from 1914 to the present time, the engineer holding an executive or administrative position with responsibility covering the costs of public-utility service has been and still is confronted with many and various financial problems which tax his ingenuity and skill. The privately owned and operated public utility has in some cases been able to offset rising costs by means of rate increases, assuming co-operation of public-utility commissions in giving rulings based upon the strict financial and economic merits of the cases presented. On the other hand, the operator of the publicly owned utility has been, still is, and probably will be for some time, cramped between rising costs and the limitations of tax income.

While the economic problem of increased expenditures for equivalent service being due to increased costs from one view point, or the depreciation of the value of the dollar from another, may be safely left to professional econ-



Views of the Lincoln and Grant Monuments by Artificial Illumination.

omists for decision, the fact remains that the balance sheet shows a margin between income and expenditures which has a decided tendency to vanish. The problem of the utility operator

Beach Scene by Artificial Light.

is, therefore, to change the respective equations of the income and expenditure curves so that the first will have more of a tendency to slope upward while the second shall tend to slope downward, the prime object being naturally to prevent the margin between the two from disappearing, or, at least, to postpone the date of the vanishing point until such time as returning stability shall allow the public-utility problem to be taken up in a sane, fair and equitable spirit.

Studies Made of Operating Conditions.

This problem confronted the electrical department of the Commissioners of Lincoln Park even before the beginning of the recent war, at which time the department operated an exterior-lighting system of some 850 inclosed carbon arc lamps in various parks and upon the boulevards of the Lincoln Park system besides some 5000 interior multiple outlets in the various buildings of the system property. In line with the tendency at that time to eliminate the older forms of arc lamps, a study was in progress, dating from April 1, 1914, with this object in view.

The problem was complicated by the fact that the park area and equipment was constantly increasing due to extension work, not only of actual land acreage, but improvement of facilities to take care of increasing necessities. All of these extensions required constantly increasing expenditures, while the available income from taxation has been constantly decreasing during this same period, the Commissioners of Lincoln Park having had available actually $35,000 more in 1910 than in 1920.

In order to reduce lighting unit costs, as well as power demand, an exhaustive study was made of the various forms of illuminants in use at that time, and it was decided to eliminate the arc lamps by substituting high-efficiency type C units. Taking into consideration the construction features of the then existing system, such as capacity of station equipment, lengths and potential gradients of series circuits, dielectric properties of cables, spacing of units, widths of drives and boulevards, available contiguous reflecting surfaces, required effective illumination and various other factors, a decision was reached as follows:

Replacals.—Replace existing arc lamps on 7.5-ampere series circuit with 15-ampere, 400-cp., type C lamps fed by compensator units fitting existing pole-top fixtures and connecting to existing high-tension lamp cables.

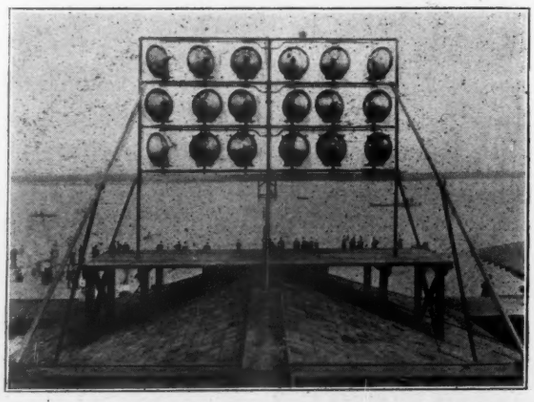
New Construction.—On all new units, feed 15-ampere, 400-cp. type C lamps from the secondary of series-multiple transformers located in hand holes or manholes near the base of the posts.

The above type of construction was so designed as to make absolutely no change in the external appearance of the unit, the concrete post, fittings and globes remaining the same, while use was made of every available portion of the arc-lamp apparatus.

In order to satisfy the requirements of replacals it was necessary to design a special compensator fixture with an ample factor of safety for 7000-volt series operation. This made it necessary to develop a construction using the base fixtures of the old arc lamps, with suitable conversion fittings, and to write specifications covering the required compensator coils. The various coils, sockets and parts were purchased and all spare arc lamps were taken apart. The usable parts were incorporated in the compensator fixtures, while the remaining parts were sold for junk. All this work was performed in the electrical-department shops by the regular crew, the compensator fixtures being taken out by the trimming teams and substituted for the arc lamps in conjunction with the regular trimming schedule. The change was accomplished in about four months at a cost of approximately $12,000.

Net Results of Changed Conditions.

These changed conditions resulted in an increase of over 100% in effective illumination with a much better quality of light and absolute steadiness of operation. The power demand was immediately reduced from 450 to 300 kw., and the total number of series circuits was reduced



Flood-Lighting Equipment for Illumination of Beach.

from 23 to 18 by doubling up certain circuits at strategic points. Other circuits were left with large additional capacity for future extensions. One entire substation was eliminated, and 8000 ft. of four-conductor cable was released for

other uses. Other substation equipment and connections released included switchboard panels, instruments and control apparatus, five transformers, eight oil switches and 35,000 ft. of single-conductor cable.

It was possible to reduce the lamp maintenance crew by one-third, and the total annual costs per lamp were reduced from $36.67 to $23.76. The gross saving in the first year of operation under the new system amounted to $15,220.89.

Taking the cost of conversion as $12,000, it is evident that the net saving in the first year of converted operation was $3220.89, the cost of conversion having been paid for by its own results after which the entire saving was clear gain. It is obvious that this type of conversion was financially successful from the start, while the electrical advantages such as increased circuit capacity, increased power-factor, steadiness of operation and general improvement are beyond estimate in dollars and cents. The improved quality of illumination was remarkable and the absence of flickering and ease of maintenance on circuits, both alive and dead, made the converted system much easier to operate.

Series-Multiple Transformer Developed.

On new construction, as outlined above, it became necessary to develop the series-multiple transformer with which experiments had been made on safety-island lighting up to 1914, these experiments resulting in the development of a rather crude form of pole-type transformer which has been more or less satislfactorily used underground. After a series of designs, calculations and experiments, a satisfactory series-mutliple transformer was developed. This equipment has a welded-steel weatherproof case with wiping sleeves designed to be wiped onto the lead cable sheaths, the entire transformer being mounted in a manhole and connected directly in a series circuit with the secondaries carried in duplex lead-covered cable to the lamp socket at the pole top. In brief, this type of transformer, which was built according to the accompanying tabulated specifications, adequately fulfills the requirements of the system.

TABULATION SHOWING SPECIFICATIONS OF SERIES-MULTIPLE TRANSFORMER.

Full-load rating, watts	225.0
Primary series current, amperes	7.5
Secondary volts	15.0
Secondary amperes, full-winding	15.0
Insulation between primary and secondary, and to ground, to withstand voltage test of	20,000
Power-factor not less than	99%
Efficiency not less than	92%
With lamp load decreased 20%, the secondary current to increase not to exceed	0.5%
Ratio to be correct within	0.2%
With 50% increase in primary voltage, primary current to increase not to exceed	30%
Open-circuit secondary voltage not to exceed, volts	40.0

This type of series-multiple transformer, properly installed, resulted in a permanently closed primary circuit and a 100% sheath-conductivity bond, thus eliminating the unknowns introduced in a circuit having certain variable contacts. It also tends toward diminution of electrolytic troubles by placing the flow-off factor more within the control of the operator. When used either with cable in conduit, or with armored cable, which was introduced into the system about this time for the purpose of lowering duct expense, the costs of construction were decreased, efficiency of operation and maintenance were increased, power-factor, regulation and circuit stability were improved, independence of units was secured, safety to the public was increased and practically continuous service was assured. The series-multiple transformer in the form used on this system, and the service results obtained over a period of years, have

View in Lincoln Park Showing the General Nature of Landscape.

shown unqualified success both from the engineering and financial standpoint.

A photograph of a heavily wooded area of Lincoln Park, shown herewith, gives some idea of the type of territory required to be lighted by this system. Absence of adjacent reflecting surfaces makes the problem one of proper choice and location of units, except in winter when the absence of foliage and the reflecting properties of snow give an extremely spectacular appearance to the installation when in full service.

As already stated, the increase in size of the system has caused an increase in the gross expenditures; even though partly offset by greatly decreased unit costs, while the operating methods called into play have made possible the handling of the present number of outlets (nearly double that before the war) with a much smaller crew. However, during the period of intensive expansion of the cable and circuit system, a large amount of temporary work was necessarily put into service until such time as the reduced maintenance crew could make it up into permanent form. As the continued operation of temporary work is always conducive to trouble, this possibility was foreseen and steps were taken to facilitate the locating of trouble when it occurred. The most successful of the various devices employed was a series ground bus. During the severe snow storms, thaws and cold waves of the winter of 1918 there developed 161

cases of circuit trouble on the series system. By the use of this ground bus, with the lamps as indicators, the average time of location of trouble was only 17 min. For the location of clean open-circuits, the potential gradient system, described in ELECTRICAL REVIEW of July 21, 1917, was occasionally used. This system was also used in the location of especially difficult grounds.

TABLE SHOWING TOTAL AND UNIT COSTS OF LAMP MAINTENANCE.

Year.	Lamps in service.	Total cost.	Unit cost.	Total net saving per year.
1911	792	$25,003.29	$31.57	.....
1912	870	25,675.66	29.51	.....
1913	901	30,781.23	34.16	.....
1914	1,010	37,040.08	36.67	.....
1915	1.179	28,031.62	23.76	$ 3.220.89
1916	1 246	24,849.10	19.92	20,970.50
1917	1,445	37,590.71	26.04	15,360.35
1918	1,628	34,188.00	21.00	25,510.76
1919	1,634	34,706.16	21.24	25,212.62

Total saving since conversion $90,275.12
Average annual saving for the last five years.$18,055.02

Beginning with the year 1911, and taking the ten succeeding years inclusive, the accompanying tabulation of exterior-lighting-system costs has been prepared.

TOTAL COSTS REDUCED BY NEW SYSTEM.

From an examination of these figures it is evident that the total cash cost of operation of the Lincoln Park lighting system was steadily rising, and if this rise had continued it is certain that the cost of illumination would have been prohibitive by the present time. Service rendered by the apparatus in use before conversion would have become far below the standard required by good present practice. However, instead of using the projected cost of operation as determined by plotting the figures obtained before conversion, the 1914 cost has been used as a basis which brings the indicated savings far below what they actually would have been had the curve of rising cost been projected on its indicated slope. Moreover, the costs indicated are cash costs and do not contain any allowance for interest, depreciation, insurance or taxes as would be necessary in determining unit costs for a privately owned public utility. As no allowance has been made for depreciation or insurance, replacements due to obsolescence, trouble or damage have necessarily been included in the cash costs which brings the figure somewhere near the proper amount which would be obtained on a similar system operating on a sound financial basis.

During the last six years the increase in prices of various electrical materials has become so familiar to those in the industry that it is not necessary to go into this question exhaustively. These increases apply as well to Lincoln Park as to any other system using similar materials. However, due to variations in local conditions, it is considered advisable to show the increases in salaries on this system within the ten-year period specified. These costs are shown in an accompanying table.

In view of the fact that labor costs have risen to the extent shown during the last six years, it has been necessary not only to reduce the amount

THE COMMISSIONERS OF LINCOLN PARK
ELECTRICAL DEPARTMENT
ANNUAL AND MONTHLY REPORT SHEET

File No. 7

Class No. T Location. Exterior Lighting Year 1919

	MAINTENANCE LABOR	MAINTENANCE MATERIAL	NEW CONSTRUCTION STA. EXPENSE	NEW CONSTRUCTION TRANSP.	SPECIAL POWER	SPECIAL CITY PHONE	SPECIAL LOCAL PHONE	DAMAGE MISC.	DAMAGE CREDIT	TOTAL
JAN	$ 500 29	$ 833 14	$ 287 22	$ 718 03	$ -					$ 2338 68
FEB	468 37	1404 21	543 50	504 67	787 87					3708 62
MAR.	565 36	470 46	418 13	725 47	984 41					3163 77
APR	503 57	769 31	469 29	688 29	837 11					3262 59
MAY	397 30	351 09	434 49	908 26	861 36					2952 50
JUNE	319 68	233 96	311 15	561 03	923 79					2348 81
JULY	422 82	434 09	237 28	495 11	844 84					2434 14
AUG	385 86	522 56	257 46	579 90	885 22				$ 32 99	2598 01
SEPT	416 28	215 34	295 07	645 57	876 58				66 81	2382 05
OCT	392 83	633 41	321 23	596 42	847 73					2784 62
NOV	499 03	744 23	313 86	1089 48	842 20				141 22	3322 59
DEC	610 69	729 31	361 87	923 84	886 63				110 40	3403 94
TOTAL	$ 5477 10	$ 7340 25	$ 4297 53	$ 8416 09	$ 9570 74				$ 351 41	$ 34700 32
AVERAGE	$ 456 43	$ 611 69	$ 358 96	$ 701 34	$ 797 56					$ 2891 61

	CONNECTED LOAD LAMPS KW.	CONNECTED LOAD MOTORS KW.	KWH CONSUMPTION	COST PER KWH	No. LAMPS IN SERVICE	No. LAMPS USED	AVERAGE LIFE OF LAMPS	COST PER LAMP PER MONTH
JAN	444.348		132,800	$ 0.01 76	1634	173	1994	$ 1 45
FEB	444.348		119,100	0.03 12	1634	184	1710	2 27
MAR	444.620		119,900	0.02 64	1636	124	2548	1 93
APR	444.620		100,700	0.03 23	1636	124	2274	1 99
MAY	444.620		90,900	0.03 25	1636	111	2311	1 80
JUNE	444.620		80,200	0.02 93	1636	103	2831	1 49
JULY	444.620		83,700	0.02 91	1636	138	1724	1 49
AUG	444.620		94,600	0.02 74	1636	77	2519	1 59
SEPT	444.620		105400	0.02 26	1636	86	2529	1 45
OCT	444.620		131,100	0.02 13	1636	153	2475	1 70
NOV	445.980		142,400	0.02 32	1640	128	2695	2 02
DEC	437.920		136,300	0.02 49	1610	113	2949	2 12
TOTAL			1337,100		19606	1514	28559	$ 21 24
AVERAGE	444,348		111,425	0.02 58	1634	126	2380	$ 1 77

QUANTITY	EQUIPMENT	UNIT COST	TOTAL COST	REMARKS
				Note—Total KWH consumption plus transmission loss is equal to 1,355,500 KWH. Average cost of power as indicated on meters as $0.00569 per K.W.H.

Cost Sheet Showing Exterior Lighting Expenses for 1919.

of labor as far as possible, but also to supplement the labor reduction by engineering methods which tend towards greater efficiency and operating economies throughout the system. In order to check the results of the change from arc lamps to type C lamps on the series system it was necessary to install a lamp and apparatus record system which was described in detail in ELECTRICAL REVIEW of Dec. 20, 1919. In this description lamp life curves were shown which emphasized the variation of lamp life plotted against time for five different makes of lamps. Also a graphical analysis was given showing the variation of lamp life with lamp hours, the period of service of the five different makes of lamps covering four years and eight months under actual service conditions. This record now comprises data covering a period of five years and four months, the record for April, 1920, showing 1257 lamps burnt out which gave 499,204 lamp hours or a general system average of 3179 hours' life per lamp.

In the matter of cost accounting there is presented herewith the cost sheet for the exterior-lighting system for the year of 1919. This record is as complete as possible under the conditions obtaining at the present time. The blank report forms in use at the present time are so designed as to cover the cost-record requirements for any class of job which the electrical department may be called upon to handle. This includes exterior lighting, interior lighting, power, any combination of light and power and the pumping of water for the entire Lincoln Park system which consumes approximately 1,500,000,000 gals. of water per year at a pressure of 65 lbs. per sq. in.

As an example of reduction in cost in the operation of the lighting and power systems, attention is called to the accompanying illustration showing the flood lighting at Diversey Beach. This lighting system serves for the general illumination of the beach and also the locker areas. The installation of flood lights at this location replaced a large number of lighting standards on

TABLE SHOWING VARIATIONS IN WAGES IN THE LINCOLN PARK LIGHTING SYSTEM.

Year.	Arc lamp repairman, per month.	Arc lamp trimmer, per month.	Maintenance electrician, per month.	Electrical operator, per month.
1911	$ 95.00	$ 91.65	$ 90.00	$ 75.00
1912	95.00	91.65	90.00	*90.00
1913	95.00	*100.00	90.00	90.00
1914	95.00	100.00	90.00	90.00
1915	*136.36	*108.00	*110.00	*110.00
1916	136.36	108.00	110.00	110 00
1917	136.36	108.00	*125.00	*125.00
1918	136.36	*120.00	125.00	125.00
1919	*150.00	*135.00	*150.00	*150.00
1920	*175.00	*160.00	*165.00	*165.00

Year.	Class "A" electrician, per day.	Lineman, per day.	Cable splicer per day.	Cable splicer helper, per day.
1911	$6.00	$4.50	$5.00	$3.25
1912	6.00	4.50	5.00	3.25
1913	6.00	5.00	5.00	*3.50
1914	6.00	5.00	*5.50	3.50
1915	6.00	*5.50	*6.00	*4.00
1916	6.00	5.50	6.00	4.00
1917	*6.25	5.50	6.00	*4.25
1918	*7.00	*6.00	*7.00	*5.00
1919	7.00	*7.00	*8.00	*6.00
1920	*8.00	*8.00	*9.00	*7.00

*Highest pay during only a portion of the year.

THE COMMISSIONERS OF LINCOLN PARK
ELECTRICAL DEPARTMENT
ANNUAL AND MONTHLY REPORT SHEET

File No. 7

Class No. 204 Location Monuments Year 1919

	MAINTENANCE LABOR	MAINTENANCE MATERIAL	NEW CONSTRUCTION STA. EXPENSE	NEW CONSTRUCTION TRANSP.	SPECIAL POWER	SPECIAL CITY PHONE	SPECIAL LOCAL PHONE	DAMAGE MISC.	DAMAGE CREDIT	TOTAL
JAN.		$ 33 35	$ 24 82	$ 17 67	$ 132 04					$ 207 88
FEB.		9 60	25 34	29 68	118 22					182 84
MAR.		5 25	32 51	30 87	214 32					282 95
APR.		—	18 92	17 10	109 01					145 03
MAY		27 51	33 31	29 45	136 68					226 95
JUNE	$ 47 55	15 48	19 47	40 00	24 48					146 98
JULY	50 16	—	22 44	25 20	124 08					221 88
AUG.	106 46	37 95	27 67	33 00	74 10					279 18
SEPT	85 88	31 32	29 52	31 24	67 06					245 02
OCT.	51 20	136 08	36 08	27 28	61 22					312 76
NOV.	69 96	128 00	32 08	80 83	48 18					354 05
DEC.	30 10	9 02	11 95	15 91	48 45					115 43
TOTAL	$ 436 31	$ 434 36	$ 314 11	$ 378 23	$ 1157 84					$ 2720 85
AVERAGE	$ 36 36	$ 36 26	$ 26 17	$ 31 52	$ 96 49					$ 226 75

	CONNECTED LOAD LAMPS KW.	CONNECTED LOAD MOTORS KW.	KWH CONSUMPTION	COST PER KWH.	No. LAMPS IN SERVICE	No. LAMPS USED	AVERAGE LIFE OF LAMPS	COST PER LAMP PER MONTH
JAN.	12.00		7192	$ 0.0290	12	5		
FEB.	12.00		6500	0.0282	12	1		
MAR.	12.00		7192	0.0394	12	1		
APR.	12.00		6960	0.0208	12	0		
MAY	12.00		8640	0.0262	12	6		
JUNE	12.00		3000	0.0490	12	3		
JULY	12.00		4166	0.0532	12	0		
AUG.	12.00		7800	0.0358	12	5		
SEPT	12.00		5280	0.0464	12	6		
OCT	12.00		6052	0.0518	12	4		
NOV.	12.00		6282	0.0563	12	0		
DEC.	12.00		4704	0.0246	12	0		
TOTAL			73768					
AVERAGE			6147	0.0369			1548	

QUANTITY	EQUIPMENT	UNIT COST	TOTAL COST	REMARKS
				January to July labor items included under "Bldgs."
				Note- All lamps on these installations are rated at 1000 watts and 115 volts.

Cost Sheet Showing Expenses of Monument Illumination.

the beach and in the water as well as the individual locker and aisle lights in the locker areas. The total number of outlets was reduced from 220 to 36 with a reduction in connected load of about 30%. This change caused a corresponding reduction in the maintenance labor and material,

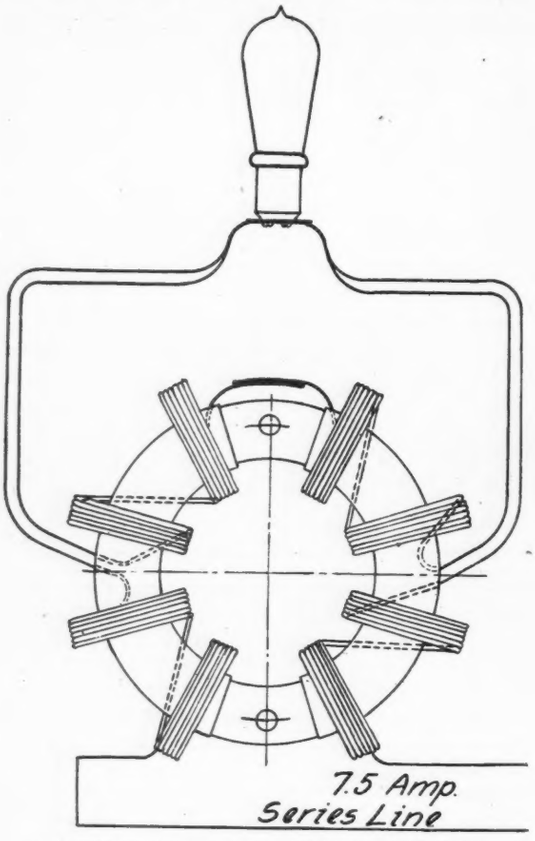


Diagram of Lamp and Individual Compensator.

requiring at the present time less than one-third the number of man hours that were formerly required.

In presenting herewith illustrations of the spectacular flood lighting of Grant's and Lincoln's monuments, there is also shown in detail the corresponding cost for the year 1919. Monument-lighting costs are not low owing to the peculiar character of the construction necessary on these installations to get the best results. The appearance of these monuments, however, under the high intensity of illumination employed, amply justifies the expenditure as evidenced by the large number of comments and inquiries called forth from widely scattered localities by these installations.

In supplying power to the Lincoln Park system it is necessary to divide the power contract into two parts in order to provide for both the 24-hr. and the 12-hr. load. The 24-hr. load includes all general power and interior lighting circuits, and is billed at $26.40 per hp. yr. The 12-hr. load includes only the series lighting system and is billed at $15 per hp. yr. The total load is determined monthly by averaging the three highest 15-min. peaks in the month, and bills are rendered monthly. Power costs for 1919 are shown in an accompanying table.

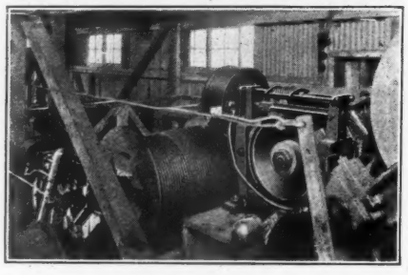
TABLE SHOWING THE COSTS OF BOTH CLASSES OF POWER FOR 1919.

	Total cost.	Power used in kw-hrs.	Average cost per kw-hr.
12 hr. load	$ 7,698.20	1,355,500	$0.00569
24 hr. load	10,413.35	1,620,000	0.00634

ELECTRICALLY OPERATED HOISTS IN SHIPYARD.

Complete Motor Equipment Is Found Practical for Shipbuilding Work in Yards of the Submarine Boat Corporation.

Each of the 28 shipways in the Newark Bay shipyard at Newark, N. J., is equipped with two motor-operated boom hoists. Three motors are required to operate each hoist, the largest motor, which is rated at 35 hp., being connected to a winding drum and used to raise and lower the boom. One of the features of this equipment is



Winding Drums and Brakes on Shipyard Hoists.

to be found in the braking apparatus, all of which was supplied by the Cutler-Hammer Manufacturing Co., Milwaukee, Wis. One of the brake equipments, a 14-in. unit used on the large boom motor, is shown in the accompanying detail illustration. Another brake similar to this one is used on the motor which operates the hoist drum. A portion of this equipment is also shown in the left-hand side of the illustration.

The swing is controlled by a 5-hp. motor equipment provided with a brake similar to that on the other motors, but without the releasing magnet attachment. The braking control in this

View of Newark Bay Shipyard, Showing Boom Hoists.

case is purely mechanical and is operated by means of a lever mounted in the operator's cab. Thus for the 28 shipways there are 56 hoists completely controlled by 168 motors.

All control equipment for each hoist is assembled in a cab at one end of the house containing the winding drums, motors and brakes. Each motor is provided with a drum-type controller of the same make as the braking equipment. The second illustration shows the location of the operator's cabs quite distinctly in the first two hoists and gives an idea of the size of the yard.

Period Styles in Lighting Fixtures

Evolution of Various Styles and Modifications, With Comment on Their Adaptation to Electric Light Sources—Simplicity and Harmony Guiding Factors in Selection of Fixtures for the Home

By M. LUCKIESH

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In a broad sense the appearance of a lighting fixture is of secondary importance. This does not mean that artistic design or period style should be neglected, for any element, however insignificant, must receive proper attention if the final result is to be harmonious. The intricacies of the artistic aspects of lighting fixtures cannot be fully discussed in a few pages, for the evolution of the various styles and their modifications and modulations leads from the roots of racial and national characteristics through the intricate branches formed by the fluctuations of the fortunes of nations. Superposed upon all these are the influences of rich or powerful or creative individuals, of increasing scientific knowledge, of new light sources, and of manufacturing and commercial expediencies. Indeed, the whole is a complex web whose unravelling would lead far afield; however, a view of the high lights should be helpful to the householder.

The architect and the decorator meet with no difficulties in this field; in fact, we criticise their past efforts chiefly because their attention has been concentrated so powerfuly upon period style, the artistic design and the appearance of lighting fixtures that they have not looked far beyond them to see the wonders of light as an expressive medium.

One of the earliest periods which is reproduced to-day is the Egyptian. The oil lamp, with its open flame, was the lighting device of the early Egyptian centuries. Ancient tombs, early writings and the relics of ancient China, of India, of early Greece, and of the Roman Empire show the oil lamp to have been the chief source of light. Naturally, it influenced the mechanical features of the early fixtures, but the ornamentation was always national or powerfully individualistic in character.

In fixtures of this period the shallow oil lamp may be a motif and the typically early Egyptian ornamentation will denote its period style. On the other hand, the oil lamp need not figure in the design, but ornamentation may serve to make the fixture of Egyptian style as illustrated in Fig. 1. Of course, the oil lamp may also be a "motif" in a fixture of the classic Greek periods, but the ornamentation will be typical of the days when Greece was a creative spirit in art.

Fig. 1.—Egyptian Ornamentation.

It is commonly conceded that several centuries before the beginning of the Christian era the Greeks developed their decorative art to a perfection which has never been excelled. It is a fundamental of much of the decorative art of later centuries and it has inspired artists of many countries up to the present time. This early Greek period is still alive and a "modern" fixture in an interior done in Greek period style is such a capital offense against the laws of esthetics that it seems unnecessary to mention the possibility. Still, such incongruities are to be found without engaging in a strenuous search. In Fig. 2 is illustrated a modern lighting fixture based upon the antique. In the age of classic Greece the oil lamp commonly rested upon such standards.

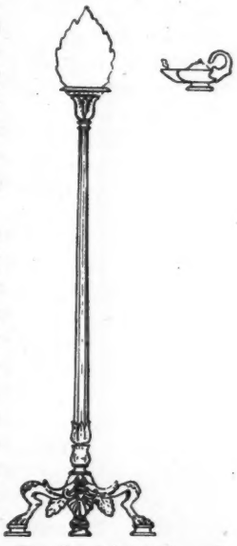


Fig. 2.—Adaptation of Grecian Fixture.

The Roman Empire arose in its might during the early centuries of the Christian era. The lamp and torch were still the chief devices of lighting and they became beautiful objects under the influence of the grandeur of the Empire. The charming simplicity of Grecian ornament was blended with the Roman magnificence and we find the ornament of the Roman period to vary considerably according to the Grecian influence.

Our liking for the antique is reflected in the modern lanterns in use to-day in halls, vestibules and entrances. These may be patterned after those of the classic periods or they may be similar to the old lanterns of iron carried by watchmen a few centuries ago. In the former case the old oil lamp is equipped with a small incandescent lamp to replace the wick, and, in the case of the lantern, glass is substituted for horn and the modern lamp has replaced the tallow candle or smoking oil wick. These substitutions must be made with care or the result may be incongruous.

Inasmuch as ornament is an important factor in the artistic design of fixtures, a few remarks regarding its place in design may not be out of place. Ornament is an accessory which does not exist apart from its application. It is not so superficial that it can be added to an object which is already satisfying in appearance without decreasing the esthetic standing of the object. Ornament is desirable only when indispensable to a harmonious effect. It is a child of our desire for beauty and it achieves its mission only when it is appropriate and fulfills a definite purpose.

The forms of ornament usually are not natural-

istic; they are derived more or less from nature, but they are generally conventionalized natural forms. For some reason we do not like too much repetition of natural forms; therefore, inasmuch as ornamentation involves repetition almost universally, the forms must be such as to be untiring or satisfactory in this respect. Styles are periods in the evolution of design and in the early centuries when these changed slowly they bore the names of nations. In recent centuries it has been common to apply the name of the reigning monarch to the styles of design if they are worthy of a name. Ornamentation bears the earmarks of racial characteristics, of national taste, of the wealth of the period, of the patronage of the rulers and of the creative power of individuals. With the growth of international intercourse, boundary lines are becoming less definite and it appears probable that they will eventually become more obscure. However, there are powerful racial and climatic influences which doubtless will always resist any tendency toward catholicism in artistic design.

Fig. 3. — Gothic (16th Century).

From the earliest periods the styles of lighting fixtures have been the products of the influences mentioned in the foregoing paragraph, but finally the tools, the materials and the skill of the workman determine the merit of the lighting equipment as objects of art. Furthermore, each new style which was created must have been influenced by the art which preceded it in its own country as well as in other countries. The variety of materials, the excellent tools and the many types of ornamental design which have withstood the test of time make it possible to produce artistic lighting equipment today to satisfy the most exacting tastes. Even the fixtures for ordinary homes need not be expensive to be true to the traditions of ornamental design; nevertheless, the market is flooded with incongruities and even monstrosities. Many fixtures to-day are assembled and parts totally unrelated to each other find themselves related in the same fixture because they happen to meet the mechanical requirements. To complete the incongruity sometimes parts are adapted to the fixture regardless of the fact that the ornamental design is upside down.

Fig. 4. — Gothic (Modern).

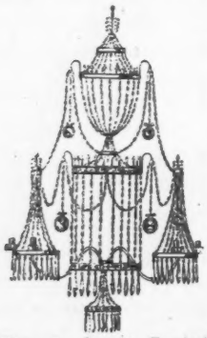


Fig. 5.—Louis Period Style.

The Romanesque had its rise in the ninth century and was fully developed in northern Italy by the twelfth century. The lighting fixtures of that time were usually beautifully carved lamps with branched arms for candles. In fact, this was about the beginning of the development of pendent lighting fixtures. Romanesque architecture is rarely produced at the present time, but this style of ornament is used to some extent.

Everyone is familiar with the Gothic as understood by pointed arches, ribbed vaulting, flying buttresses and its typical carvings. So many of the historic cathedrals have been of Gothic design that we are inclined to feel that this period style inspires reverence by its calm dignity. Surely there are Gothic masterpieces in art which can not be excelled. The Gothic style, which developed between the twelfth and seventeenth centuries, is full of Christian symbolism. At first it was rather crude and heavy, but later it became highly ornate and more delicate. During this period the walls of houses were wainscoted and painted and decorated wtih romantic, biblical and legendary subjects, and raftered ceilings were common. The fixtures for these historic structures were made in the age of candles and were commonly lanterns or coronae bearing candles. They were wrought in the days when workmen lived for their art, as the exquisite workmanship testifies. In Fig. 3 is illustrated a Gothic lantern, and in Fig. 4 is a modern Gothic fixture.

Fig. 6. — French Renaissance Influence.

It is sometimes a difficult problem to adapt modern illuminants to fixtures upon which strict demands are made by the purity of the architecture which they are to illuminate. However, this has been done successfully in many cases, but the success has been due to a close co-operation of sicence and art. Of course, Gothic fixtures play but a small part in residence lighting, but the Gothic influence is to be found in many modern fixtures suitable for use in the home.

The Italian Renaissance, which followed the Romanesque and Gothic, is the most elaborate of the classic styles. It added to the old Roman much delicate and elaborate ornament such as Abaresque scrolls, acanthus leaves, flowers, ribbons, fruit, human and animal forms, and conventionalized designs evolved from these. The Renaissance applies particularly to Italy, but its influence was felt in other European countries.

In France the finest Gothic impulse began to wane toward the close of the thirteenth century and the national artistic mind was in a condition to be influenced by the innovations of the Italian Renaissance in the fifteenth and sixteenth centuries. During these centuries the French aristocracy was very rich and, according to the ideas of the period, was also refined and cultivated. The incomes of these aristocrats were drawn from lands automatically, so they were not in touch with the realities of life, which build well-rounded rugged characters. This highly cultivated society gave its chief attention to the gratification of taste for beautiful surroundings. Henry IV in 1608 established a factory for making beautiful furniture, and gath-

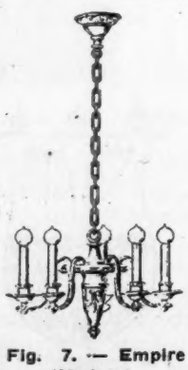


Fig. 7. — Empire (Modern).

ered in his palace, the Louvre, many masters of the pure and applied arts. Later, Louis XIV continued the royal patronage of art and under such auspices it was natural for the ornamentation to become elaborate and gorgeous. The artists and craftsmen were encouraged to produce extravagant designs to please the vanity and jaded taste of the rich courts of Louis XIV and XV.

The best known of the French styles are Louis XIV, Louis XV, Louis XVI and Empire. They are somewhat related, because they evolved successively. During the reign of Louis XIV the decorative details were rich to the extremity of gorgeousness, but they were refined and showed the influence of classic origin. In Fig. 5 is illustrated a crystal chandelier of this period. In the latter part of his reign the ornament began to exhibit the influence of a debauch of extravagance which culminated during the reign of Louis XV into wanton and even meaningless ornamentation. This debauch wore itself out and the craftsmen returned to severer forms, but the delicacies of the details of the previous period persisted. During the reign of Louis XVI the styles displayed refined elegance, which finally approached the purely classic after the Revolution and the foundation of the Empire. But with the passing of these extravagant monarchs, who did so much toward the development of art, the national and personal influence largely disappeared. A modern "shower" of elaborate treatment after the French Renaissance is illustrated in Fig. 6.

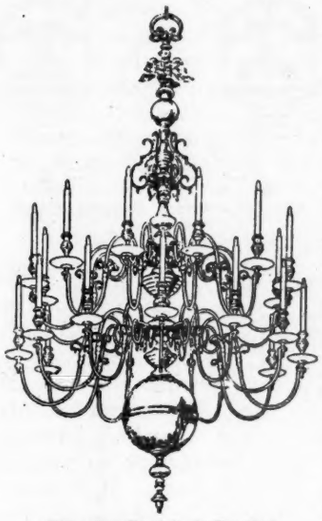


Fig. 8.—Dutch Influence.

During these centuries the candle was the prevailing source of light and the elaborate fixtures were designed for them. The candle is so completely associated with the fixtures of these French periods that the designer of to-day must exercise his ingenuity to adapt them to modern light sources. However, the candle has been fairly well counterfeited by miniature incandescent lamps with appropriate bulbs, especially when the light is subdued by a warm yellow tinting. The modern crystal fixture, which is inherited from the French periods, can scarcely be true to its style unless small light sources are used. Where they are hung low they are usually glaring with modern light sources, and therefore should not be used if the artistic demands can be satisfied by another design. In fact, lighting is sufficiently important at the present time to be an influence upon the choice of period style for an interior. Certainly if slavishness to bygone art is practiced at the cost of glaring fixtures and visual discomfort we are, indeed, lacking in creative ability.

Fig. 9.—Elizabethan.

The severity in design which began to appear in the latter part of the reign of Louis XVI developed finally into a return to the classic, which resulted in what is now known as the Empire period style. A modern Empire candelabra is illustrated in Fig. 7. This style was founded upon early Greek and Roman styles. At first classicism was carried to extremes. The details apparently were influenced by the preceding Italian wars and the expedition to Egypt. Among them were helmeted heads, mouldings representing Roman faces (from which the present "reed and ribbon" evolved), and winged figures symbolizing victory. It is interesting to note that since the fall of the Empire, France has not developed any new styles, if we may except for the present the L'art Nouveau which began to be developed recently.

Fig. 10.—Hepplewhite.

The conditions of life in the Netherlands was quite opposed to those in neighboring France. The Dutchman was stolidly struggling for a living against formidable odds. He reclaimed land from the sea and held it at the cost of eternal effort. The people were diligent workers and enterprising in business and in manufacture. There was no gilded aristocracy or gay court, as in France. There were rich persons, but they earned their wealth in contact with the realities of life. The Dutch and Flemish painters painted these realities and craftsmen were guided by national instinct and character. The gay court of the king of France naturally attracted the finest and most imaginative artists and craftsmen, but the work of the Dutch designers who remained bears the impress of homeliness, practicability, simplicity, and human interest. A modern fixture showing Dutch influence is illustrated in Fig. 8.

Fig. 11. — Georgian (Modern).

The Elizabethan period style which arose in the latter half of the sixteenth century reflects the Italian spirit. During this era panelled rooms and stuccoed ceilings prevailed. Oak was commonly used for the woodwork and in the better houses painted linens and hangings, tapestries and embroideries hung on the walls. A modern adapta-

tion of the Elizabethan is illustrated in Fig. 9. In England during the eighteenth and nineteenth centuries the French influence in design was very powerful, but the period was also blessed with creative designers, and the Georgian

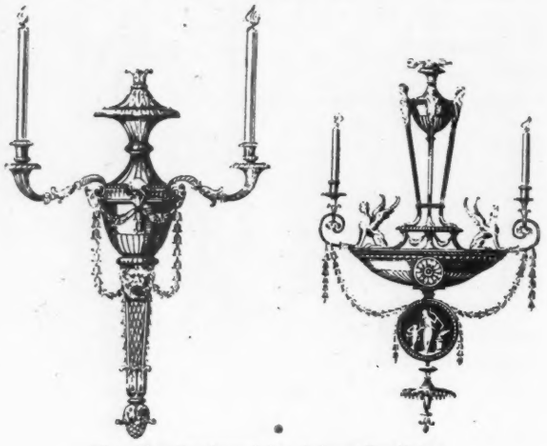


Fig. 12.—Designed by Adam Brothers.

period, which includes the individualistic work of the Adam brothers, Hepplewhite (Fig. 10), Sheraton and Chippendale, became the most interesting periods of English design. A modern fixture of Georgian period is illustrated in Fig. 11. R. and J. Adam, architects and designers, developed during the reigns of George II and III a style founded upon classic lines which is popular in fixture design at the present time. During their time excavations of the Pompeii ruins were bringing to light many excellent examples of the luxurious decorative art of the days of Pompeii. The Adam brothers sensed the beautiful spirit of antiquity and transfused it with variety and novelty through their works. Two wall brackets designed by them are illustrated in Fig. 12. The principal motifs of the Adam style in the Georgian period are rosettes and medallions, delicate wreaths, classical mouldings, and festoons consisting of flower-like husks with conventionalized bows of ribbon. Many exquisite examples of candelabra sconces and brackets designed by the Adams brothers are still the inspiration of fixture designers.

Fig. 13.—Adam (Modern).

A modern wall bracket of Adam style is illustrated in Fig. 13 and the ornamentation of this style as applied to modern glassware is shown in Fig. 14. Difficulties arise in adapting modern lamps and sockets to the delicate and graceful fixtures of the Adam style, but ingenuity has produced some worthy results. Designers of all periods have doubtless had to meet new problems, but, despite the difficulties, various artistic styles have been developed. There are limitations imposed by the size of the rooms and the relatively small use of ornamentation and period style in the architecture and decorations of the modest home. A fixture under these conditions must be relatively simple if it is to be unobtrusive. In the Adam style we find embellishment which is peculiarly unobtrusive.

Our own Colonial style was influenced by European period styles. The colonists furnished their homes with many things brought from across the Atlantic. In New England and Virginia the English styles were chiefly used and the influence of the Georgian is evident. In fact, our Colonial art was perhaps often Georgian modified by transplanting it into a new country where somewhat different conditions prevailed. New York or New Amsterdam, being settled by the Dutch, developed a colonial style after the designs prevalent in Holland. In Louisiana the early colonial designs were the Louis and Empire styles transplanted. From these various influences and sources we developed our Colonial style. The influence of the oil lamp with its chimney, which appeared during the colonial days, is seen in the fixtures. A modern Colonial bracket is illustrated in Fig. 15 which harmonizes well with the white woodwork so popular during those early colonial years. It is somewhat amusing to see some of the colonial fixtures of the present time with shades pendent instead of upright bowing to the requirements of modern lamps and lighting.

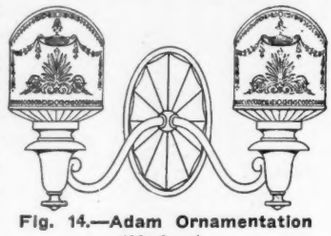


Fig. 14.—Adam Ornamentation (Modern).

In recent years L'art Nouveau, a modern style, arose in Europe to meet the new conditions imposed by electric lighting. In order to adapt the modern lamps to fixtures designed after the styles of the days of candles and early oil lamps, it has been necessary to conceal wires, to disguise sockets and to use ornamentation to screen these modern accessories. Although these older period styles are beautiful it is gratifying to know that new movements are seething; that is, that the creative spirit still lives. From the experimenting which is now in progress it appears possible that a new period style, acceptable from the standpoint of art, may evolve. These evolutionary periods must arise in artistic expression as well as in other lines of progress if we are really to advance. To be content with the art of the past and to deform or degrade it, as is often necessary by using modern equipment in fixtures whose original designs were adapted to light sources which have been cast aside during the march of civilization, is to admit the lack of creative ability. L'art Nouveau may not survive, for it has not won a permanent place among period styles. The reasons, perhaps, are not due to lack of creative ability, but to the adverse conditions imposed by a commercial and manufacturing age. Whether or not a modern period style will rise to power

Fig. 15.—Colonial (Modern).

depends upon the outcome of the struggles between art and commercialism and between taste and indifference on the part of the user of lighting fixtures. It is too early to ascertain what is a typical example of this new movement. One of the products is illustrated in Fig. 16.

As we look over a display of fixtures which are intended for the home we are often struck with the meaningless combination of stock parts in many fixtures which are supposed to be "high grade." Such objects cannot endure. They will tire the householder eventually when it dawns upon him that they are meaningless to the point of barbarism. There is an intangible quality to artistic objects which outlasts centuries. Antiquity is often overrated in art; that is, there is an inclination to enthuse too much over objects whose greatest claim to attention is that they have been caressed by the hand of antiquity. Nevertheless we cannot deny that one test of true art is that it never grows old in the sense of spiritual decadence.

It is hoped that this brief outline will aid the householder in appraising lighting fixtures. A few principles have been interwoven and some illustrations have been presented. However, it will require much more attention to the subject before one can be certain of his judgment concerning period styles. The safest procedure for those who are not sure of their ground is to seek advice of an architect, of a decorator or of a reliable dealer. On viewing fixtures let him arouse his artistic sense to serve him in analyzing the component parts of the fixture and their relation to each other, so that incongruities will be brought to light. It is well to remember that esthetics and artistic design do not necessarily mean embellishment, increased cost and a sacrifice of efficiency and economy in their broad sense. In the displays of the fixture dealer there are incongruities and gems of artistic design intermingled, and charming fixtures can be obtained at no greater cost than monstrosities and misfits. Simplicity of design is a safe refuge when in doubt in the selection of fixtures. And finally, let us emphasize the importance of harmony. This is the soul of the artistic expression of an object, of a grouping of objects and of a setting as a whole; it is the true measure.

Fig. 16. — Example of L'art Nouveau.

IMPROVEMENTS CLAIMED FOR THEATER SPOTLIGHT.

Convenient Projection, Horizontal Movement of Top Electrode, Controls Grouped at Back, and Other Features Are Part of New Lamp.

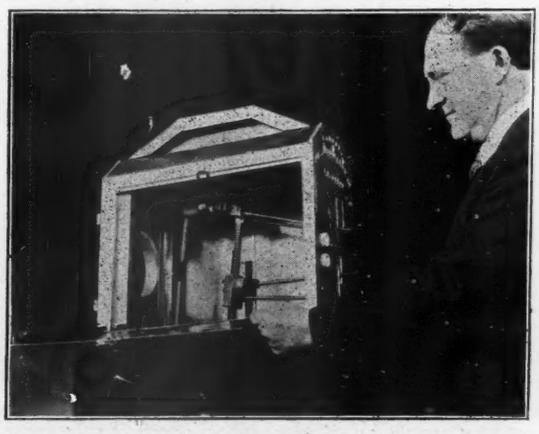
A theater spotlight with a number of distinctive features has been developed by J. M. Triplett, of San Francisco. The most important characteristic is a sliding condenser, by means of which perfect projection can be made even when there is a considerable angle, for instance, when the projection booth is at the top of the gallery

New Theater Spotlight Posessing Several Interesting Features.

or in a similar place where projection is not at right angles to the curtain.

There is a horizontal movement of the top carbon, as well as the usual vertical movement, so that the carbon may at all times be placed in exactly the proper position for maximum efficiency. All controls are placed at the back of the lamp housing, instead of forcing the operator to manipulate controls at the back, base and side. The stand provided with the lamp is equipped with ball-bearing casters, and thus enables the lamp to be moved with a slight pull, instead of in the cumbersome manner necessary with old-style spotlights.

A simple arrangement operates to balance the



View of Lamp House of New Spotlight, Showing Controls at Back.

lamp house wherever it is set, and thus it is unnecessary to clamp and unclamp it; it may be moved with a slight touch to follow a performer across a stage. Demonstrations of the new spotlight have been made in San Francisco with evident success.

Lighting of Hospitals and Dental Offices—Part I.

Results of Investigation Show Lack of Adequate Lighting in Majority of Medical Institutions—Recommendations for Proper Equipment for Hospitals and Dental Offices and Laboratories

By A. L. POWELL and H. H. ALLISON
Edison Lamp Works, Harrison, N. J.

A review of the history of lighting does not reveal much progress in the methods of application until an efficient light source in the form of the type C lamp became available. Since that time, however, rapid strides have been made in illumination practice in the way of providing more effective and more comfortable results.

Persons in every walk of life realize what advances in lighting have been made, as they are being confronted constantly by them on the street, in the stores, theaters and public buildings. As these methods of better lighting have become more widespread, they have been adapted to almost every field of human activity. It is singular to note, however, that scientific branches of endeavor have been the slowest to take advantage of the new era in lighting. The medical profession, although it has profited somewhat by modern lighting conditions, has still greater opportunities if it avails itself of the latest developments.

This condition applies particularly to hospitals, which as a class are far behind other types of buildings as to adequate lighting. This is indeed unfortunate, for proper lighting is probably more important here than in almost any other public institution. By its application the patient rests comfortably and regains normal health more quickly, and the surgeon performs his work with far greater efficiency. Such a state of affairs is no doubt due to oversight, for the authorities are unanimous in adopting any features of equipment which they believe will further their wonderfully humanitarian work.

In collecting information on this subject, 100 leading hospitals in the vicinity of New York City were visited, and only two were provided throughout with lighting equipment of the most modern type. Yet in almost all these hospitals the surgeries were fitted with the best instruments, sterilizing apparatus, operating and antiseptic devices known to science. Strange to say, however, artificial illumination had received practically no attention, the same fixtures and methods of illumination prevailing as when incandescent lighting was in its infancy.

Reception Room in a Large Hospital with Totally Indirect Units for General Illumination, Supplemented by Decorative Wall Brackets, Table and Floor Lamps.

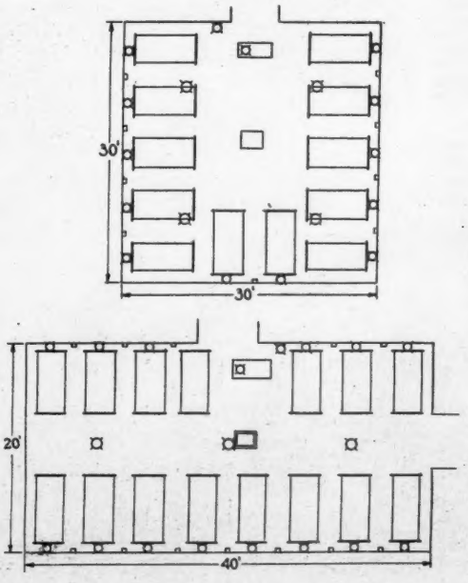
As a general statement, natural lighting conditions are accepted as the best for most work and the development of the type C lamp has made it possible to obtain conditions which approximate daylight.

As pointed out, perhaps in no other class of buildings are the lighting requirements so varied and yet as exacting. Not only must the question of providing adequate illumination in a given room be considered, but attention must be paid to the fact that the human element is being dealt with in a most trying condition.

Special Requirements in Lighting of Lobby and Reception Room.

The main entrance of the hospital, a lobby or reception room gives the patients and visitors their first impressions of the institution. The lobby of the more pretentious building usually receives special decorative treatment at the hand of the architect, being finished in marble with suitably decorated walls and ceilings. The columns, stairways and elevator entrances are in artistic harmony. An ornamental type of lighting fixture, in keeping with the decorative scheme, is therefore essential to this part of the building. Here, if anywhere, money can be expended on massive fixtures to gain harmony in decoration. At the same time, special precautions must be taken that the light sources are not glaring. This would preclude the restful atmosphere desired.

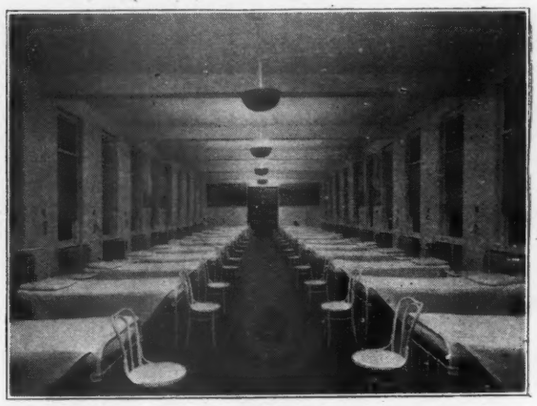
If direct lighting is used, suitable means must be taken to screen the lamp filament from view by the use of diffusing shades or globes. The indirect system inherently takes care of this factor. A combination of one or more pendent ceiling fixtures with harmonious wall brackets will provide an even distribution of illumination.



Typical Arrangement of Outlets in Wards of Both Square and Rectangular Type.

To facilitate entrance and egress an intensity in the neighborhood of 2 foot-candles is desirable. With well-diffused direct lighting or indirect systems, this value can be obtained by providing approximately 0.5 watt per sq. ft. of floor area. If surroundings are particularly dark this value should be increased somewhat.

In the larger buildings the reception rooms adjoin the lobby and are fitted up more or less



Indirect System in a Ward of Oblong Shape, Using Single Row of Outlets.

as residential living rooms, being provided with easy chairs and tables for the comfort of those waiting who wish to read and write. Two practices in lighting apply to such rooms. The first provides a sufficient intensity, say 3 or 4 foot-candles, through the entire room from suitably placed overhead units; the other, which is more comfortable and quieting, provides merely a low intensity of general illumination and supplements this with a number of suitably placed and properly shaded local table or floor lamps. This arrangement gives a touch of light here and there which is artistic and restful.

Small hospitals and dispensaries, of course, do not have an elaborate lobby or reception room, and often utilize part of a corridor for this purpose. A moderate intensity of 3 to 4 foot-candles of well-diffused light should be provided in this part of the building, with the standard type of equipment used for corridor lighting.

The present lighting, as pointed out above, of a high percentage of the institutions leaves much to be desired. Of the 100 hospitals inspected only five have their lobbies and reception rooms lighted in a manner which would be deemed satisfactory to the experienced lighting engineer. Over 14% were illuminated by glaring incandescent lamps without any means of shielding the light, while 15% had a single gas jet as their only lighting.

Corridors Are Best Lighted by Means of Indirect System.

The hospital corridors or passageways are usually provided with hard surfaced walls, ceilings of light color and white tile floors which can be readily cleaned. To be in keeping with the modern sanitary conditions the lighting fixtures should be of a simple construction, easily cleaned, and non-dust-collecting. They should be so arranged that direct rays will not strike the eyes of the patients.

The totally indirect method is desirable for lighting corridors of buildings where the highest standards prevail. The system of direct lighting, employing a compact ceiling fixture with a suitable diffusing reflector, also furnishes good

illumination and is widely used. There are many types of sanitary fixtures designed exclusively for hospital use, being dust-proof with enamel finish.

As only sufficient light need be furnished to permit easy passage, an intensity of 1 foot-candle is adequate. For direct lighting an allowance of 0.25 watt per sq. ft. of floor area will give the required illumination, providing the surroundings are light in color. This value should be increased slightly if surroundings are dark; for example, a corridor 8 ft. wide might well be furnished with 25-watt Mazda lamps in direct lighting reflectors or globes on 12-ft. centers.

Inclosing Glassware Diffuses the Light in This Square-Shaped Ward for General Illumination.

The investigation of hospital buildings before mentioned indicated that the same condition of inadequate illumination exists in the corridors as in the lobbies. Only 20% are lighted to the desired intensity. Half of those which were inadequately lighted had sufficient wattage, but poor application resulted from use of inappropriate fixtures. The remainder were not provided with sufficient outlets and used glaring light sources.

Indirect Lighting System Best Suited for Hospital Wards.

The ward is essentially a sick room for accommodating a number of patients at the same time. The size is determined largely by the purpose for which the hospital is used. They generally are provided with hard surfaced walls and ceilings of light color, and floors of glazed surface which may be readily cleaned. Typical wards of square and rectangular shapes with the usual arrangements of beds are shown in an accompanying illustration.

Owing to the fact that the patients' eyes are directed toward the ceiling for hours at a time, the lighting must be of a nature that will not strain or tire the eye.

In the evening hours visitors are received who desire to move about or sit and talk with the patients; at this time also nurses and doctors perform their routine duties in preparation for the night. A well-diffused system of general illumination is necessary to provide lighting that will be sufficient for the ordinary purposes as described above.

Localized lighting over the beds, additional to the general system, are necessary. This should be of a character which will permit the patients to read or pass the time at other occupations requiring close vision without eye strain. It also is frequently necessary for the doctors or nurses to attend a patient at night, and they need a high intensity of illumination for the use of instruments, etc.

All hospitals require the lights in wards to be extinguished after a certain hour, but a night light is necessary to enable the nurse or others to move about with ease and exercise the necessary supervision.

Analyzing these requirements it is found that the totally indirect system is probably most suitable for the general illumination, although semi-indirect units may be used if equipped with dense bowls. The direct method using totally opalescent globes may be utilized in small wards or in remodeled buildings where conditions are not favorable for indirect lighting.

Two or more rows of ceiling outlets are necessary to provide even distribution of general illumination in wards which are square in shape, but the long narrow type require only a single row of fixtures as shown in the accompanying diagram.

The proper intensity of general illumination for wards has been the subject for considerable discussion. The consensus of opinion, however, is that an intensity of 2 foot-candles on the bed level is desirable.

If the indirect system is used with light surroundings the above intensity will be obtained by an allowance of 0.5 watt per sq. ft. of floor area. If surroundings are dark this should be increased slightly. For example, in the accompanying sketch of a ward the dimensions of 20 by 40 ft. give a floor area of 800 sq. ft. If the indirect method is to be used with light surroundings an allowance of 0.5 watt per sq. ft. would require a total of 400 watts to light the room. If three outlets are provided each fixture should have about 150 watts. Thus three bowls provided with three 50-watt lamps each would be required to light the room to the desired intensity.

Semi-Private Ward Lighted by Single Porcelain Enameled Totally Indirect Unit.

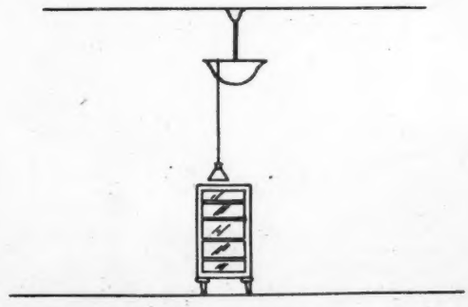
Outlets with a bracket fixture for local lighting should be provided over or between the beds to furnish sufficient illumination for special pur-

poses, as explained above. There are several types of wall bracket fixtures available for this purpose. One fixture which reduces wiring costs and is very desirable combines the lamp and an extra receptacle in the same base. A base of white flat glass is attached to the wall, and an opalescent reflector conceals the source and directs the light on the bed. Below the lamp is located a flush receptacle to which portable lamps, heating appliances or instruments may be attached. The importance of providing an extra receptacle cannot be over-emphasized. It is obviously undesirable to remove the lamp from the lighting fixture every time energy is desired for these purposes and unless equipment such as that just described is provided, baseboard outlets at frequent intervals are essential.

A common method of providing the night lighting is by use of low-wattage lamps, wired on a separate circuit in the fixtures for general illumination, which are kept in operation when all other lamps are switched off. A modern method for night lighting of wards is the placing of lights in the floor within trough reflectors covered by clear plate glass. The light is, of course, sent to the ceiling and diffused downward. This arrangement gives a light of low intensity and precludes all possibility of annoyingly bright fixtures.

A somewhat more elaborate night lighting system uses individual floor lamps such as found in the modern Pullman sleeping cars. Small pockets lined with reflecting material are recessed in the baseboard. The light from low-wattage lamps shining through a set of baffles or louvres is cast in a narrow streak onto the floor between the beds, not visible to the patient, yet making all objects readily discernible.

As a night light is intended to furnish just enough light to discern large objects, such as



Tapping Off a General Lighting Unit for Illuminating the Medicine Chest.

beds and doors, an intensity of 0.25 foot-candle is sufficient. An allowance of 0.1 watt per sq. ft. of floor area will give this result. Thus, in the accompanying sketch of the square ward, the dimensions of 30 by 30 ft. give a total area of 900 sq. ft.; an allowance of 0.1 watt per sq. ft. would indicate that a total of 90 watts was required for night lighting. A 25-watt Mazda lamp in each of the four indirect units shown is the solution.

The location of the nurses' desk is generally at some convenient place near the entrance, and an outlet should be provided for a portable desk light to be used by the night nurse in making up the records, etc. A wall bracket or other suitable lamp should also be provided over the chart rack to permit its examination at night.

The medicine cabinet should be provided with suitable light during the night, so that the nurse

Night View of Utility Room, Showing Local Lighting from Bracket Units.

may select the proper container without groping or making mistakes. A simple method of accomplishing this, and at the same time securing a night light, is shown in the sketch. The medicine cabinet is placed under a fixture and a drop light with rather dense translucent reflector is suspended over its glass top.

Interesting figures are obtained from the inspection of lighting conditions in hospital wards. Those equipped with both general and local illumination comprise only 42% of the total; 43% depended solely on general lighting, and 15% on local lamps alone. The indirect methods were used in 10% of the wards which possessed general systems. Bare lamps on fixtures and drop cords composed 14%, and gas lamps 2%. Properly lighted wards comprise only 4% of all those visited, and over 90% did not exceed 1 foot-candle in intensity.

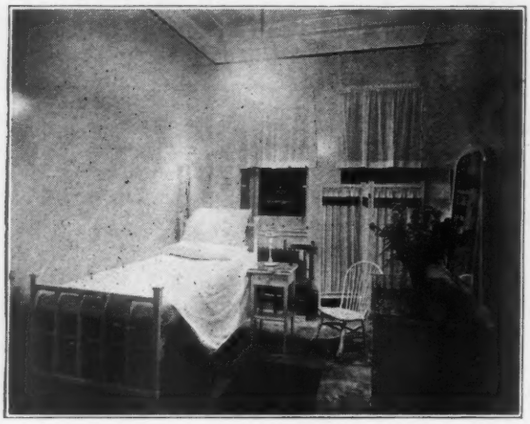
The small utility rooms for washing apparatus, sterilizing, preparing food trays and the like located adjacent to ward or in other parts of the building, as well as the dressing and nurses' rooms, should be lighted by a suitable ceiling fixture and have local units over sinks, sterilizing apparatus or desks, as the case might be. Baseboard receptacles should be provided in all of these for use with portable devices.

Lighting in Private Rooms Can Be Elaborate and Decorative.

The private room in the hospital resembles a bedroom which has been especially equipped for the care of the sick. In many instances it is highly decorated with luxurious surroundings, similar to one in a private residence. A well-diffused general illumination and local illumination similar to that previously described may be used. The intensity need not be as high as in the ward, owing to the fact that it is used by fewer persons. The fixtures employed in lighting may be somewhat elaborate and decorative to suit any particular interior. The indirect systems are preferable for general illumination where conditions are favorable.

The direct system may also be used for this purpose where indirect methods are not practical,

care being taken to provide suitable diffusing media. A central ceiling fixture should be supplemented by wall brackets or table lamps near the bed. These should be fitted with reflectors



Semi-Indirect Fixture Provides General Illumination. Aided by Table Lamp and Bracket Unit.

or decorative shades which will diffuse and direct the light where needed.

If the combination wall bracket fixture and receptacle described before are not used, a separate receptacle for heaters or instruments is necessary. Additional lamps over dressers or mirrors may be provided if conditions permit. The general illumination should be controlled by a wall switch near the entrance doorway, while the local or bed lamp must have a switch within convenient reach of the patient.

Only about 10% of the hospitals visited are properly lighted in the private rooms. The rest employ single fixtures with ineffective reflectors or bare lamps.

(To Be Continued.)

SWISS RAILWAYS TO PUSH ELECTRIFICATION PROGRAM.

In connection with approving terms of a $25,000,000 loan in the United States for the Swiss federal railways, the national council has just recommended to the railway authorities that all construction work which is not of an urgent or indispensable character be suspended. It is stated that whatever funds are available will be used so far as possible to push the electrification program, which is already well advanced on the Gotthard line. The difficulty of obtaining coal and its high cost make it urgent that the Swiss railways develop and utilize as rapidly as possible the tremendous water-power resources of the country which are still untouched.

PURCHASES MINORITY INTEREST IN RADIO CORPORATION.

The American Telephone & Telegraph Co., in order to carry out the purposes of the recent agreement with the General Electric Co. to cooperate in advancing the art of radio transmission and communication, has purchased a minority interest in the Radio Corporation of America. W. S. Gifford, vice-president of the American Telephone & Telegraph Co., has been made a director of the Radio Corporation of America.

Adequate and correct lighting plays an important part in the success of the small store, shop or restaurant. The smaller places must depend on attractive displays, pleasant surroundings and individual service to get and hold their patronage. Distinction is gained for that store, the interior of which is flooded with the soft, even, glareless radiance of harmonious lighting. It creates the right atmosphere. In the reproduced photograph of Pulako's Candy Store at Erie, Pa., the noticeable absence of sharp, deep shadows and the even, clear glow which fills the whole place is both pleasing and restful.

Lighting Fixture Standardization

Idle Capital Is Released and Manufacturing Costs Are Reduced by Elimination of Many Useless Fixtures—Buyers Make Selections More Easily From Smaller Assortment of Designs

By CHARLES H. HOFRICHTER

Secretary, National Council of Lighting Fixture Manufacturers.

The National Council of Lighting Fixture Manufacturers realized at the very beginning of its organized work that one of its greatest avenues of service to the industry would be along the lines of standardization of the parts and fittings used in the construction and manufacture of its product. In an industry such as this, that never had been organized or co-ordinated in any way until the formation of the National Council of Lighting Fixture Manufacturers, and where each one gave expression to his own ideas of that which he considered either artistic or useful, there is bound to be produced an abundance of incongruities that sooner or later create a chaotic and confusing number of items. Many of these items are intended to, and really do, answer the same purpose and only differ slightly in shape or form.

In this industry there had grown up such a conglomerate mass of mis-matched and ill-mated articles that the ordinary buyer, when getting quotations on items supposed to be standard and staple articles, always had to ask for samples or specify dimensions and gauges of metal and then watch the goods very carefully when they were received to see that they were up to specifications of size and gauge. Instead of continuing such a practice, the industry is now building the foundations of standardization so that a buyer of staple articles will merely have to note on the order or request for quotation that the goods desired must be made and finished according to the standards of the National Council of Lighting Fixture Manufacturers. It might also be stated that ultimately it is hoped to have standards perfected to such a degree that they may be filed in the offices of architects who, instead of writing out detailed specifications of how lighting fixtures are to be made and what they are to be made of, can merely specify that all fixtures to be furnished for a proposed building or structure shall be made according to the specifications and standards of the National Council of Lighting Fixture Manufacturers.

Question of Arriving at Satisfactory Basis of Agreement.

Some of our friends do not hesitate to call attention to the fact that the road to be traveled is a long one, and register doubt as to ever being able to reach its end. We do not dispute the fact at all that the road is a long one, but we have our own opinions as to being able to accomplish the ultimate purpose. At least it is felt that a start has been made and the object aimed at is known. When going anywhere, one of the principal things to know is just where and how you expect to arrive. It has already been indicated where we expect to arrive, but the how of it is another question. Only those who have in some manner tackled such a problem know the many little kinks and differences that must be met and overcome in order to arrive at some satisfactory basis of agreement. For example, there are now in hand a number of samples of 2¼-in. socket covers made by ten different manufacturers, and while they are all intended to answer the same purpose there are no two of them exactly alike as to shape or contour. There are almost as many different gauges of metal as there are shapes, and there are not more than two of them that are alike in the rolling of the bead, placing of the bushings, sizes of the screws, depth of skirt or clearance for the glassware.

Engineer Engaged to Study Samples.

The council has engaged an engineer to pull these samples to pieces and study their contour, the gauges of metal used, the sizes of glassware, the kind of bushings and screws and their length, the thread and its pitch, the smoothness and porosity of the metals, the sizes of the beads, the depth of the skirt and all other details of this one particular part. After he has concluded his studies he will make up a drawing of a proposed standard. Copies of this proposed standard drawing will then be sent to all manufacturers whose samples were examined and pulled to pieces, the idea being that they may make suggestions and criticisms and, drawing from their practical experience, say why or why not it should be thus and so. After their comments have been received and studied a revised drawing will be made for an approved standard. This new drawing will then be presented to the National Executive Committee for its final approval, after which it will be ready for distribution to the membership for use as the national standard of this organization.

To some this may seem a long way around, but we are new to such a task as this and naturally must feel the way along until such time as experience will teach a better and shorter way or until we are able to draw sufficiently on the experience of others to make it possible to overcome or avoid the difficulties they have learned to master. We have already been in touch with the American Engineering Standards Committee and, while we have not yet done so, we hope to establish a working basis with them if such an arrangement will help our cause along.

It may be added further that, since the organization of the council, considerable stress has been laid on the fact that the entire product of

lighting fixtures should be more standardized and that designs similar in makeup and appearance should be weeded out. It is safe to say that there is not a manufacturer belonging to this organization who has not benefited by this wave of "cutting down the line," as it is popularly called among the trade. In some instances lines have been cut to as low as one-third their former size, and in many instances to one-half or two-thirds. This in itself has meant no small item to the industry as a whole. Salesmen do not have as large and confusing lines to show buyers, and the buyers are more satisfied with a smaller line if it is inclusive. Orders are received for certain numbers in larger quantities, and more orders come in for the same numbers than before. This simply means that the factories may be run on a better and more standardized basis than when the business required production of a greater variety of equipment.

Catalogs are not required to carry quite so many old or obsolete patterns as were carried heretofore. Many of these old styles were listed more to fill up space and make a showing than to sell. Last, but not least, a great deal of idle capital, tied up in patterns, tools and jigs for making one or two of these few obsolete numbers during the course of the year, has been released and the manufacturer has been able to carry a larger stock of those materials that were moving in quantities. Such an arrangement incidentally makes possible better deliveries on these certain items that are in demand.

It is believed that, since this standardization propaganda has been circulated during the last year and a half, no less than $500,000 has been converted into more liquid capital. This conversion of idle to useful capital has added a new working value to the industry.

EXTENDING SCOPE OF SPECIAL COMMERCIAL COURSES.

Arrangements have been completed by the faculty of the engineering school of Pennsylvania State College to so arrange certain branches of its curriculum that its graduates will be available for employment in the technical and factory departments of the Western Electric Co. Particular attention will be devoted to developing executive possibilities in the students.

The Western Electric Co. has similar arrangements with several other educational institutions at the present time and in addition maintains a post-graduate course for its own personnel at Columbia University. It is also extending the scope of the special commercial courses which it offered its non-technical employes a few years ago.

AWARD WESTINGHOUSE ENGINEERING SCHOLARSHIPS.

The war memorial scholarship committee of the Westinghouse Electric & Manufacturing Co. has announced as the winners of the four scholarships for the coming college year, 1920-21: Alva C. Corrao, small motor drafting department; Henry Gardiner Symonds, son of N. G. Symonds, manager industrial sales division, Chicago office; J. Dale Seabert, transformer engineering department, and Herbert R. Hillman, son of William A. Hillman, who has been a machinist in the works of the R. D. Nuttall Co. for 27 years.

These war memorial scholarships were established in 1919 as a means for perpetuating the memory of those employes of the Westinghouse company and its subsidiaries who took part in the great war. Each scholarship carries with it the annual payment of $500 for a period not to exceed four years. The payment is to be applied towards an engineering education in any technical school or college selected by the successful candidate and approved by the scholarship committee.

SELLING THE LIGHTING IDEA TO THE GENERAL PUBLIC.

Saratoga Springs, N. Y., Entertains 60,000 People at the Inauguration of a New Street-Lighting System.

Selling the lighting idea to the public on a large scale is what the city of Saratoga Springs, N. Y., did on June 19, when a new system of street lighting was inaugurated with a lighting carnival which was attended by nearly 60,000 persons from Central New York, more than the famous watering resort had entertained in years.

A new ornamental lighting system known as the "Duoflux" was installed under the direction of W. D'A. Ryan, director of the Illuminating Laboratory of the General Electric Co., Schenectady, N. Y. This is the first system of its kind to be operated anywhere in this country.

The duoflux lighting system, a product of much engineering research, makes it possible to shift from a high to a low candlepower by means of relay cutouts installed in the fixture casings. The cutouts are operated by short-circuiting the supply transformer at the power station, and serve to disconnect a large lamp and connect, in its stead, a small lamp mounted in the same globe. In this manner the change from high to low candlepower is accomplished without a duplication of lighting circuits.

Two Lamps of Different Size Are Mounted in Each Globe.

The 140 main street standards are equipped with two globes, each globe containing a 1000 and a 250-candlepower lamp. The smaller lamps are suspended directly above the larger ones. Lamp standards installed in Congress Spring Park are similar in design to those used on the city streets, but have only a single 250-candlepower type C lamp with each standard. There are 53 of the modified lamps in the park system. The standards, with the ornamental globes of special design, present a particularly pleasing appearance both in the park and on the city streets.

The installation at Saratoga Springs was financed at a cost of about $42,000 by the Adirondack Electric Power Corp., Glens Falls, N. Y., and the city has signed a contract for service at a cost of $13,000 a year. For this expenditure the city will get several times the amount of light from the old system of 600-candlepower mast-arm units. In addition to the increased

Views of Street-Lighting Installation at Saratoga Springs

Night Scene in Saratoga Springs, N. Y., at the Official Starting of the New Lighting System.

Dancing Under the Jeweled Arch.

Old and Modern Lighting Units.

Congress Springs Park, Showing the New Lighting Standard Installed.

illumination, the appearance of both the park and the streets will be much improved by the substitution of truly ornamental fixtures for the old units.

After midnight, when the large lamps are extinguished, the city has approximately four times the candlepower of the original system, and in the early evening the streets are practically floodlighted by the large units. The celebration attending the official lighting included folk dancing under an arch of jewels illuminated by searchlights, fireworks, band concerts, and a parade with decorated floats and illuminated airplane exhibitions.

From an electrical merchandising standpoint the affair presented many points of interest to central-station men, dealers and the trade in general. It demonstrated the unusual interest of the public in modern lighting and at the same time served as an example of what may be done in many other cities, both large and small.

REFLECTION OF LIGHT EXPLAINED BY ELECTRON THEORY.

By Terrell Croft.

When a column of æther light waves impinges on an object the "light" due thereto is either transmitted through the object, reflected from the object or absorbed by it, depending on the nature and properties of the material comprising the object. However, all or a part of the light may be absorbed, reflected or transmitted. If the object is of a material which is a good reflector, practically all of the light will be reflected, very little absorbed and possibly none transmitted. If the object is a good absorber, a piece of black cloth for example, practically all of the incident light will be absorbed and very little reflected and transmitted. If the object is a good transmitter —transparent—practically all of the light may, under certain conditions, be transmitted and very little reflected or absorbed. Some light must be reflected from every object which we see, otherwise we could not see the object.

The objects (luminous sources excepted) which we see about us are, then, visible to us only for the reason that they reflect a portion of the æther waves which are originated by some luminous source. These originating waves then impinge on the objects from which they are reflected to the retinas of our eyes.

Every kind of matter—every sort of object—is composed of electrons which, for the most part, are revolving in circular orbits. When light impinges on the surface of an object some or all of the incident æther waves are stopped by the matter—revolving electrons—at or near the surface of the object. If the material of which the surface of the object is composed is such that the electrons in the atoms comprising it are capable of rotating at such speeds that they can vibrate at the same rate as the impinging æther waves, then they do vibrate at that rate. New trains of waves are generated by these vibrating electrons in the object and the light is then said to be reflected.

If the æther waves of all visible frequencies—white light—impinge on the object and there are electrons comprising the different atoms in the surface of the object which are capable of vibrating at all of these visible frequencies, then the light reflected by the object will be white light and the object will appear white to the eye.

If the electrons in the surface of an object are capable of vibrating only at some definite frequency, corresponding to the wave length or frequency of some particular color, and if white light impinges on that object, only light of that particular color will be reflected to the eye. The object will then appear to be that of color. Thus, if the electrons in the atoms in the surface of a book cover are capable of vibrating only at the frequency corresponding to that of red light, and white light impinges on the cover, the reflected light from the cover will produce on the retina of the eye the color sensation of red. This sensation will be transmitted to the retina of the eye by the optic nerve and then the observer sees a red book cover.

If the light impinging on an object is not white light, but is due to only the certain wave length corresponding to some certain color such as red, when that light falls on an object it can stimulate in the surface of the object only those electrons which are capable of vibrating at the frequency corresponding to red light. Hence, if the surface of the object does contain electrons capable of vibrating at red-light frequency, the light reflected from it to the eye will be red light or light of a reddish hue. If the surface of the object does not contain any electrons capable of vibrating at the red-light frequency, then none of the red-light rays can be reflected to the eye and the object will appear black.

Considering the illustrations further, if there are no red-light waves in the light impinging on an object, it is obvious that none of the electrons in the surface of the object can be made to vibrate at red-light frequency and no red light can be reflected from it. Thus, the red book cover referred to above if viewed in the greenish light of a mercury-vapor lamp (the light from this lamp contains no red rays) will appear black.

The important thought in this electronic theory of reflection is that when the light waves from a luminous source impinge on an object, these waves are arrested by the electrons in the atoms of the object. However, the electrons in the surface of the object may, under the conditions defined above, originate new trains of æther waves to the eye whereby the object becomes visible by reflected light. Reflection of light, probably, does not then involve the redirection of the original incident waves. It, so it is believed, involves the generation and transmission of new trains of æther waves to the retina of the human eye.

COMPETITION FOR MOTION-PICTURE SCENARIO.

A competition has been announced by Richard H. Rice, manager of the Lynn (Mass.) works of the General Electric Co., for a scenario or plan for a motion picture which will illustrate by events in an industrial establishment the benefits accruing to all concerned by the practice of fair play and the attainment of a spirit of cooperation. For the best effort $50 will be paid, for the second $25, and three prizes of $10 each for the third, fourth and fifth contributions in order of merit.

EDITORIAL COMMENT

Standardization of Lighting Fixtures

Along with other branches of the electrical industry, the producers of lighting fixtures have combined their efforts in the interests of standardization and have formed an organization known as the National Council of Lighting Fixture Manufacturers. This organization has been in existence for only a little over a year and already is able to report visible evidences of the results of its efforts. On another page of this issue appears an outline of some of the things already accomplished.

What the fixture manufacturers are now doing, for their own benefit and for the benefit of the public, should be done by every other class of manufacturers. If a business subject to all the influences surrounding the design, manufacture and marketing of lighting fixtures can be organized and standardized, surely other commodities can be produced in accordance with fixed plans that would result in advantage to all parties concerned. The electrical industry stands out as an example of progress, no other important industry having been able to keep pace with it during the past 40 years. The efforts being put forth in the interest of standardization bid fair to maintain the industry in its position of leadership in the years that are to come.

Standardization of lighting fixtures does not mean that the customer will have only one or two types from which to select, but rather that there will be a variety of types and styles of a known quality. Instead of being offered a number of supposedly standard products, all looking very much alike, but in reality being of widely different quality, the customer will be given the opportunity of selecting fixtures to suit his artistic tastes without having to study the details of manufacture to assure himself against disappointment in the end. Uniformity of sizes in many details results in an interchangeability of parts without the sacrifice of strength, beauty or cost. The public will benefit by the new order of things, as it always has benefited by the past progress in the industry, but the industry will also continue to benefit by its own progress and by the rewards resulting from the approval of the public.

The fixture manufacturers are to be congratulated on the success already attained in their own work. They are also to be commended for telling others of their success in a spirit of frankness that cannot help but work for good. Other branches of the industry will do well to consider carefully before giving up the idea that their product can be reduced to standards. Harmony and a little concerted effort will find a way around or through the hardest of problems.

Convenience Outlets in the Home

One of the besetting sins of Americans is their preference for appearance rather than worth, particularly when either must be sacrificed. The man who purchases a suit of clothes is concerned principally with its appearance. Likewise, the man who builds a house is concerned, generally, first with appearance and afterward with convenience and durability. And even such thought as he gives to convenience is concerned with convenience for the present. His house must look well from the outside no matter if tin is used in the valleys of the roof instead of the more nearly permanent copper. Also, the house must look well if the hardware is made of material that will rust, if joists and purlins are knotty, and if an adequate supply of outlets for the household electric devices that are sure to be used later on is not provided. It seems that the American desire to "make a showing" at the least possible expense is consuming, although one's better judgment admits that appearance is a less economical quality than convenience if economy in either is to be observed.

This characteristic is unfortunate when it influences the construction of the home. To fail to build into the invisible portions of a house all of the accessories that proper living conditions and modern household devices demand when the house is being erected is far from economy. Their cost then is trifling. Once the house has been completed, their cost in itself is considerable. But what is more important than monetary expense is the interval of unsettled conditions that transpires while the accessories are being installed, the dirt and refuse that pervades the house meanwhile, and the fact that the installation hardly can be as satisfactory as if they had been built in when the house was erected.

No greater mistake can be made than to sacrifice convenience of the home for appearance. It should be remembered that convenience satisfies the occupant, but appearance satisfies the neighbor. The prevailing American idea seems to be to construct the house and adapt the ac-

cessories to it. A more nearly scientific and economic plan is to design the accessories, such as lighting, plumbing and heating systems, and build the house around them. But the best and cheapest plan is to design house and accessory systems concurrently. The simple case of properly located outlet boxes proves the soundness of this reasoning. If the outlets are arranged in their proper places in the baseboard, the amount of work required to attach a vacuum cleaner at intervals throughout the year certainly is small compared to the amount required to attach it to a socket hung from the ceiling. If it is not possible to install the outlet boxes after the house is constructed, the housewife must continue the unsatisfactory practice of using the lamp socket. And the whole difficulty arises because someone had a greater preference for external appearance than for convenience.

Co-operation Needed to Satisfy the Customer

Who is responsible for the ill feeling that some people express whenever "electric lights" become the subject of conversation? Everyone in the industry has met any number of individuals who seem to take pleasure in condemning their lighting service or equipment, or in telling that they cannot use this or that device. To be sure there are a great many more satisfied users of electrical service and conveniences than there are dissatisfied ones. The disgruntled customer represents a very small minority, but, by his continual activity, he plays a considerable part in the molding of public opinion. A single individual may prevent a dozen prospects from becoming customers by telling how the service is unsatisfactory, how the lights burn out, how the flatiron does not heat properly, how the fuses blow at a particularly inopportune time, how the house caught fire from the wires, etc.

All of the things named do happen, although, to the credit of the industry, accidents of real consequence are quite rare. But who is to blame for the activity of the individual who spreads the doctrine of dissatisfaction and discontent? Undoubtedly certain individuals complain without any excuse whatever, but, on the other hand, there are many instances where a customer pays his money for energy, construction work, appliances and fixtures, and then fails to receive a full measure of service.

The individual householder is not to blame if he does not know how to design the illumination or to lay out the wiring for his home. Neither is he to blame for not knowing how to select appliances suitable to his needs. The householder has paid his money for the tangible things which he can see in the form of fittings, fixtures and meter readings, but still does not receive that intangible thing called service, which, after all, is what he intended to secure. The contractor who wired the house is not responsible for unsatisfactory service. The contractor did his work according to the existing regulations and made only a reasonable profit on the job. The dealer who sold the fixtures, lamps and appliances is not to blame because the customer, as a rule, makes his own selection from among the types and styles available. The central-station company is not to blame for poor service because it maintains a fairly uniform pressure on the customer's service connections at all hours.

A dissatisfied customer cannot settle the blame for his difficulties on anyone, and so often becomes a spreader of discontent. These people seldom discontinue their own service, but do not often use all that they should and many times prevent others from taking service or from making the most of what they have available. It is this lack of full utilization that costs the industry heavily in profits and costs the public equally heavily in lack of convenience and service. Obviously, as the dissatisfied customer found, no single individual or agency is to blame for poor service, but all are to blame collectively. The central-station company, the contractor and the dealer have all rendered a good measure of service for the price paid, but in many cases these three agencies have rendered service that did not completely harmonize one with the other.

Co-operation is the only means available to the industry to effect a complete organization of effort that will give the customer the service satisfaction for which he pays his money. Central-station companies, contractors, dealers and manufacturers are organized among themselves to a certain degree, but organization between the various groups is woefully lacking and very much to be desired. With the contractor building his circuits to fit the service of the central-station company, and to harmonize that service with the fixtures and appliances sold by the dealer, the customer is assured satisfaction. Under such conditions the home will be well lighted and provided with appliances, the contractor will have work to do, the dealer will have equipment to sell and the customer will pay and be satisfied. With an active organization working for the common interest, the few remaining customers having a measure of difficulty can be cared for without imposing an unduly heavy burden on anyone. With all customers receiving a full measure of service, and with all related interests working in mutual understanding and harmony, the entire industry is bound to be placed on a higher business and financial level.

THE WEEK'S NEWS

Reports of Important Meetings, Developments and Other Happenings of the Electrical Industry and Its Allied Interests

NEW ISSUE OF STOCK BY PHILADELPHIA ELECTRIC CO.

Proceeds of Sale to Be Used for Construction Requirements, Enlarging Distributing System by Additional Substations, Etc.

On Sept. 1 a meeting of the stockholders of the Philadelphia Electric Co. was called for the purpose of taking action upon an issue of $15,000,000 of 8% cumulative preferred stock, and authority was granted to increase the authorized capital stock of the company from 2,000,000 shares of the par value of $25 each to 2,600,000 shares of the same par value. The officers of the company were instructed to issue for cash at par 240,000 shares of 8% cumulative preferred stock at $25 each, aggregating $6,000,000 to the holders of the common stock of the company.

The proceeds of the sale of this stock are to be used for construction requirements made necessary by the great demand upon the capacity of the company's system, including the new generating station at Beach and Palmer streets, Delaware river, and enlarging the distributing system by additions to existing substations and lines, and the construction of an additional substation. The first section of this generating station is rapidly nearing completion. It is designed to house 100,000 kw., and two units of 30,000-kw. capacity each are expected to be in service in time to take care of the coming winter's load.

The full capacity of the system had been reached by the fall of 1919 and these additions are designed to take care of not only the increased demands upon the part of the company's old consumers but for additional contracts numbering over 20,000, which have been made during the first seven months of this year. The generated output of the stations for the present year to date is over 25% greater than that of last year.

IRON AND STEEL ELECTRICAL ENGINEERS TO MEET.

Plans Outlined for the Annual Convention to Be Held at the Pennsylvania Hotel in New York City Sept. 20 to 24.

The Association of Iron and Steel Electrical Engineers will hold its annual convention in New York City on Sept. 20 to 24, with headquarters at the Pennsylvania Hotel. The program for the four-day meeting is as follows:

On Monday morning, Sept. 20, there will be registration of members and a business session, with reports of committees and election of officers. In the afternoon W. A. Cornwell will give an address on "Practical Education of Steel Mill Electricians," followed with a paper by Walter Greenwood on "Relation of Standardization in Electrical Equipment to Safety."

At Tuesday morning's session, D. M. Petty will talk on "Power Transmission for Industrial Plants," and A. L. Freret will discuss the subject of "Underground Transmission." An excursion has been arranged for the afternoon.

The addresses slated for Wednesday consist of "Some Considerations in the Determination of Auxiliary Drives," by Gordon Fox; report of the electrical development committee by E. S. Jefferies, chairman, and "The Reversing Electric Mill Considered from the Standpoint of Tonnage," by K. A. Pauly. The annual banquet will be held on the evening of Sept. 22.

The morning session of Thursday will be opened with an address by T. E. Keating on "Centralized Turbine Generating Stations for Steel Mills," which will be followed by R. H. Keil on "Current Limit Reactance." In the afternoon the report of the electric furnace committee will be presented by Chairman E. T. Moore.

The report of the Standardization Committee will be submitted by W. T. Snyder, chairman, on Friday morning. The afternoon will be set aside for an excursion.

EXECUTIVE COMMITTEE OF N. E. L. A. HOLDS MEETING.

National Budget Approved—Plans Made to Protect Member Companies from High Coal Prices—Arrange for Big Meeting in December.

Representatives of electrical manufacturers attended an executive committee meeting of the National Electric Light Association for the first time, when on Sept. 1 a meeting was held at the association headquarters in New York City. The meeting was very representative of the country, several presidents of geographic divisions being present, and E. M. Herr, president of the Westinghouse Electric & Manufacturing Co., and E. W. Rice, president of the General Electric Co., representing the manufacturers. W. A. Layman, president of the Wagner Electric Manufacturing Co., was unable to attend the meeting.

Others present were: President Martin J. Insull; Vice-Presidents M. R. Bump and Frank W. Smith; H. C. Abell, treasurer; W. H. Atkins; T. D. Crocker, president, North Central Division; C. R. Hayes, president, New England Section; E. W. Lloyd; W. C. Lounsbury, president, Great Lakes Division; W. R. Kenney, president, Pennsylvania Electric Association; Walter Neumuller; E. A. Phinney, president, Rocky Mountain Division; O. H. Simonds, president, Middle West Division; M. S. Seelman, chairman, Commercial Section; Leon H. Scherck, president, Eastern New York Section;

M. S. Sloan, vice-chairman, Public Relations Section; J. C. Van Duyne, chairman, Accounting Section; M. H. Aylesworth, executive manager; S. A. Sewall, acting secretary; A. J. Marshall, committee secretary; Fred W. Herbert, superintendent, service department; George F. Oxley, director of publicity; W. J. Canada, electrical engineer; Eugene Vinet, secretary, Canadian Electrical Association. A. B. Lisle, H. T. Sands, R. S. Hale and R. V. Prather, secretary, Great Lakes Division, attended as guests.

The national budget, including budgets for the four national sections and the thirteen geographic divisions, was presented, discussed and approved. The budget covers all activities of the association, including the activities which the geographic divisions will carry on in line with the new program of the association.

A report of the membership committee showed a net gain of 287 members over a year ago.

Matters pertaining to the coal situation were discussed at length and every effort will be made by the National Electric Light Association to see that its member companies are protected, in so far as possible, from high prices and shortage.

President Insull announced that Charles L. Edgar, of the Edison Electric Illuminating Co. of Boston, and M. S. Sloan, of the Brooklyn Edison Co., have been appointed members of the advisory board of the super-power survey along the Atlantic seaboard as representatives of the N. E. L. A., and that they had accepted the appointments.

A resolution passed by the American Water Works Association formally approving the grounding of secondaries of electric light systems to water-piping systems was endorsed by the executive committee.

No action was taken regarding the place at which the 1921 convention will be held.

Meetings of the executive committee will be held every six weeks at the call of the president. There will be two big meetings, one in December and one in March, at which it is expected that all presidents of geographic divisions and all other members of the committee will be present. The intermediate meetings will be for the transaction of routine business which probably will be carried on by those members of the committee living in the East and Middle West.

The March meeting will be held in Chicago at the same time the annual convention of the Illinois State Electrical Association, the Illinois Gas Association and the Illinois Electric Railway Association are to be held. It is expected that the national executive committees of the American Gas Association and the American Electric Railway Association also will meet in Chicago at that time.

ORGANIZE SUBSIDIARY OF WESTERN ELECTRIC CO.

The organization of a new company in Argentina to take care of the telephone requirements of the countries in the lower part of South America is announced by G. E. Pingree, vice-president of the International Western Electric Co. It will be known as the Compania Western Electric Argentina and is expected to form an important link in the group of subsidiaries which the American company has been establishing throughout the world during the past few years.

The capital stock of the new company consists of 5000 shares of 100 pesos each. Its headquarters will be located at Buenos Aires. H. C. Mitchell, who formerly acted as resident manager for the Western Electric Co. in South America, has been elected president of the Argentine company. Americans are particularly interested in the new venture as the company has practically a virgin field. Previously all supplies required for the telephone system of Argentine and its neighbors were imported, a condition which seriously handicapped the growth of lines of communication below the equator.

ISSUE ORDER TO CONSERVE POWER IN CALIFORNIA.

The following order was posted Aug. 31 by State Power Administrator H. G. Butler to power companies and city mayors of central and northern California: "No electric energy shall be furnished or used for advertisements, notices, announcements or signs designating the location of an office or a place of business or nature of any business; for the external illumination or ornamentation of any building; for lights in the interior of stores, offices or other places of business when such stores are not open for business; for excessive street lighting intended for display or advertising purposes. This order shall not be construed to prohibit furnishing or using electricity for such lights as may be required by law or public safety."

The order will remain in force until Oct. 1. The necessity for issuing such instructions is the power shortage owing to lack of rain in California last winter.

BUREAU FORMED TO STUDY MERCHANDISING CONDITIONS.

Westinghouse and Affiliated Companies Establish Bureau in New York City to Analyze Conditions in Electrical Appliance Market.

The growth in the use of electrical appliances for household purposes has created a demand of large volume for certain electrical products, and has brought these products close to the general buying public. Electrical goods have now become merchandise, and the jobber and the contractor-dealer have taken on a new large and growing importance.

In order to obtain maximum advantage from these changed conditions, the Westinghouse Electric & Manufacturing Co., the Westinghouse Lamp Co., and some of the affiliated companies have joined in the formation of the "Westinghouse Merchandising Bureau," the purpose of which is primarily to make special studies of the problems of marketing electrical merchandise and to suggest plans which should result in securing the maximum benefits for all distribution of electrical merchandise.

The bureau will make a special study of the various national electrical associations that are in any way connected with merchandising work,

such as the National Electrical Supply Jobbers Association, the National Association of Electrical Contractors and Dealers, the Commercial Section of the National Electric Light Association, the Society for Electrical Development, and others. Endeavor will be made to keep in touch with the local branches and sections of these organizations and act as a clearing house of information between the various sales offices and in regard to meetings, presentations of papers, speakers and similar activities. The bureau will also devise ways and means of displaying and exploiting electrical merchandise by means of demonstrations and other methods.

M. C. Morrow, formerly resale assistant to the manager of the supply department of the Westinghouse Electric & Manufacturing Co., has been appointed manager of the bureau, the headquarters of which will be at 165 Broadway, New York City. M. C. Turpin, formerly assistant to the manager of the publicity department of the Westinghouse Electric & Manufacturing Co., will have charge of the publicity work of the bureau.

Samuel Adams Chase, special representative of the supply department of the Westinghouse Electric & Manufacturing Co., while not directly connected with the bureau, will have his headquarters in the offices of the bureau in New York City, and will continue his activities in the field of electrical association work in connection with the bureau.

MEETING OF PENNSYLVANIA ELECTRIC ASSOCIATION.

Program for Thirteenth Annual Convention at Bedford Springs Full of Interesting Subjects on Various Phases of the Industry.

The Pennsylvania Electric Association held its thirteenth annual convention at the Bedford Springs Hotel, Bedford Springs, Pa., this week.

The convention opened on Thursday morning, Sept. 9, with an address by President W. R. Kenney and with routine reports. The afternoon session was devoted to commercial subjects, the following matters being taken up: Report of rate committee by Henry Harris, chairman; "Power Service," by G. M. Gadsby, West Penn Power Co., Pittsburgh; "Electrical Merchandising," by Thomas W. Berger, Philadelphia Electric Co., and "Value of Purchased Power," by Joseph McKinley, Duquesne Light Co., Pittsburgh.

The program for the technical session, held on Friday, consisted of report of engineering committee by Paul Spencer, chairman; a paper on "Coal Supply and Distribution," by J. D. A. Morrow, vice-president, National Coal Association; an abstract of the report on power-factor by Messrs. Russell, Gaskill and Currier of the Philadelphia Electric Co., presented by Charles J. Russell, and a paper on "Coal Storage," by O. P. Hood, chief engineer, Bureau of Mines, Washington, D. C.

At the operating session the following subjects were discussed: "Economical Arrangement of Pole-Line Transformers," by George S. Humphrey, West Penn Power Co., Pittsburgh; "Family Spirit in the Organization," by Frank F. Hennaman, Penn Central Light & Power Co., Altoona, and addresses on safety by S. B. Hare, president, Railway Claim Agents' Association of the United States, and H. B. Harmer, safety engineer, Philadelphia Electric Co.

Friday evening, addresses were made by M. H. Aylesworth, executive manager, National Electric Light Association, and Hon. William D. B. Ainey, chairman, Public Service Commission of Pennsylvania.

The accounting and executive session was held Saturday morning, when the report of the accounting committee was submitted by Chairman H. R. Kern, followed by an address on "Income and Excess Profits Taxes," and report of the public policy committee.

CONTRACTOR-DEALERS OF TENNESSEE PLEDGE UTILITIES SUPPORT.

Association in Convention at Nashville Promises Aid to Relieve Conditions Intolerable to State Power and Lighting Companies.

Indicative of their devotion to the best interests of the industry, the Tennessee Association of Electrical Contractors and Dealers, in annual convention at Nashville, Sept. 4, pledged support and co-operation to the public utilities of the state. The convention also resolved to initiate through the National Association of Electrical Contractors and Dealers a movement seeking a more "reasonable margin of profit" in the retailing of washing machines.

R. L. Clift, of Memphis, who was re-elected first vice-president, acted as presiding officer. There were in attendance 58 contractor-dealers from throughout the state, several visiting dealers from other states and a number of jobbers and representatives of manufacturers. As the result of the annual election P. W. Curtis, Chattanooga, was elected president; R. L. Clift, Memphis, first vice-president; C. R. Wright, Knoxville, second vice-president; James Shannon, Nashville, third vice-president, and Joseph A. Fowler, Memphis, was re-elected secretary-treasurer. Chattanooga was selected as the next meeting place, the date to be decided later.

The resolution pledging support of the state utilities was unanimously adopted following a report that the central-station company at Memphis has been unable to extend its service or make repairs to its existing properties because of the refusal of the state public utilities commission to grant an increase of rates. Similar reports came from other points in the state.

As an outgrowth of a discussion of margin of profits in electric washing machine sales there was another resolution adopted with a view to obtaining the support of the National Association of Contractors and Dealers in obtaining a more profitable arrangement with the manufacturers.

Enthusiasm and earnest consideration greeted the address of W. H. Synans, a Nashville dealer, on "Selling Appliances on Term Payments." The opinion of the convention was unanimous that easy payments broaden the business and bring many new customers.

Another paper that provoked extended discus-

sion and much interest was entitled "Proper Handling of Fixture Sales," by P. W. Curtis, Chattanooga. Similar interest was manifest in the paper on "Conducting a Retail Store," by J. A. Fowler, Memphis, and one on "Electrical Advertising," by E. S. Dunham, Memphis.

Other papers were: "Fall and Winter Business Outlook," by C. R. Wright, Knoxville; "The Mazda Lamp," by O. G. Heinke, Nashville; "The Tennessee License Law," by W. R. Herstein, Memphis; "Comparison of Profits in Electrical and Hardware Trades," by H. G. Street, Memphis, and "Window Display," by W. S. Vaill, General Electric Co., Cincinnati.

ELECTRIC VEHICLES TO BE FEATURE OF NEW YORK SHOW.

The cars of two manufacturers of electric vehicles who entered the field during the past year will be seen for the first time at the New York Electrical Exposition in October. The Berg Electric Car Co. will show a passenger car, while the newly formed Steinmetz Electric Motor Car Corp. will exhibit an industrial truck and a commercial vehicle.

The automobile exhibits at the show are to be grouped on the 47th street side of the second floor of the Grand Central Palace. Passenger cars, commercial vehicles and industrial trucks and tractors will be shown. In addition to the Berg and Steinmetz exhibits there will be displays by the Baker R. & L. Co., Commercial Truck Co., Oneida Truck Co., Lakewood Engineering Co., Lansden Co., Walker Vehicle Co. and Ward Motor Vehicle Co. In addition to these booths, a part of the third floor has been set aside for demonstration purposes, and the industrial trucks will be seen in actual operation.

MAINTENANCE OF LIGHTING EQUIPMENT EMPHASIZED.

Under the title of "How to Get More Light from Your Present Equipment" the Industrial Commission of Wisconsin has compiled pertinent suggestions as to proper maintenance of lighting installations. These have been incorporated in a bulletin the commission is sending to the industrial concerns in the state and are as follows:

You cannot prevent depreciation of a lighting system, but you can overcome its ill effects by systematic maintenance.

Many times factory managers tell us, "When these lights were first put in the illumination was fine, but now it is poor." They don't seem to realize that dust and dirt accumulate on lighting units the same as on desk tops. They forget that electric lamp bulbs wear out the same as belting, bearings and other items. They lose sight of the fact that light ceilings and walls, which contribute so much to the effectiveness of the illumination, become soiled and thereby lose their light-reflecting qualities.

Systematic maintenance is the remedy. It is the only way you can get continuously adequate illumination in your plant. Put some responsible man in charge of the maintenance of the lighting system and give him full authority to get results. Instruct him to wipe dust and dirt off the lighting units as frequently as the conditions require it and to wash them thoroughly with soap and water at least every third or fourth cleaning. Tell him to fill the empty sockets and to replace burned out and blackened lamps with new ones of correct size and proper voltage rating. Refinish the ceiling and upper walls in white or some light shade, and when they become soiled again, wash them or renew the finish.

In this way you will get all the illumination you are paying for. If you do not systematically maintain your lighting, you are paying for something you are not getting, because a dirty blackened lamp consumes as much electrical energy as a clean new lamp. And since it is a demonstrated fact that good lighting is a major factor affecting production, your best self interest will not permit you to ignore the lighting in your plant.

For these reasons it hardly seems necessary to call attention to Order 2118 of the Wisconsin Industrial Lighting Code, which makes mandatory that all lighting equipment, including windows, be periodically cleaned, inspected, kept in order and when defective replaced.

ANNUAL MEETING OF LYNN SECTION OF A. I. E. E.

At the annual election of officers on Aug. 30 of the Lynn (Mass.) Section of the American Institute of Electrical Engineers, L. C. Loewenstein was chosen chairman, and D. F. Smalley secretary-treasurer. The proceedings were featured with an illustrated lecture by Prof. E. G. Coker, of the University of London, on "Photo Elasticity," which is a photographic method of determining the stresses of materials.

COMING CONVENTIONS.

Rocky Mountain Section of the National Electric Light Association and Colorado Electric Light, Power & Railway Association. Joint meeting, Glenwood Springs, Colo., Sept. 13-15. Headquarters, Colorado Hotel.

Association of Edison Illuminating Companies. Annual convention Eastern Point, New London, Conn., Sept. 13-16. Headquarters, Griswold Hotel. Secretary, Preston S. Millar, 80th street and East End avenue, New York City.

New England Section of the National Electric Light Association. Annual convention, Kineo, Me., Sept. 13-16. Secretary, O. M. Bursiel, 149 Tremont street, Boston, Mass.

Indiana Electric Light Association. Annual convention, French Lick, Ind., Sept. 15-17. Secretary, Thomas Donahue, Lafayette, Ind.

Association of Iron and Steel Electrical Engineers. Annual convention, New York City, Sept. 20-24. Headquarters, Pennsylvania Hotel. Secretary, John F. Kelly, Empire building, Pittsburgh, Pa.

Illuminating Engineering Society. Annual convention, Cleveland, Oct. 4-7. General secretary, Clarence L. Law, 29 West 39th street, New York City.

National Association of Electrical Contractors and Dealers. Annual convention, Baltimore, Md., Oct. 4-9. Headquarters, Southern Hotel. Secretary, W. H. Morton, 110 West 40th street, New York City.

Electric Furnace Association. Meeting at Ohio State University, Columbus, O., Oct. 6. Secretary, C. G. Schluederberg, Box 911, Pittsburgh, Pa.

Empire State Gas and Electric Association. Annual convention, Utica, N. Y., Oct. 7-8. Headquarters, Hotel Utica. Secretary, Charles H. B. Chapin, 29 West 39th street, New York City.

National Association of Electrical Inspectors. Annual meeting, Philadelphia, Oct. 12-13. Secretary, W. L. Smith, Concord, Mass.

International Association of Municipal Electricians. Annual convention, New Orleans, La., Oct. 19-22. Secretary, Clarence R. George, Houston, Tex.

Electric Power Club. Fall meeting, Hot Springs, Va., Nov. 15-18. Headquarters, Homestead Hotel. Secretary, C. H. Roth, Adams and Loomis streets, Chicago.

COMMERCIAL PRACTICE

New-Business Methods, Policies, Rates and Kindred Central-Station Matters for the Man Engaged in Selling Electricity

GIVE CUSTOMERS REASONS FOR ADVANCES IN RATES.

The Public Service Co. of Northern Illinois in sending out its customers' bills last month enclosed a folder containing a resumé of the conditions impelling the company to apply for the authority to increase its rates for service, which authority was granted Aug. 1 by the Public Utilities Commission of Illinois. In addition, advertisements were printed in all newspapers throughout the territory served by the company, copies being posted in the district offices also. The company states that there is every indication of a complete recognition by customers and the public of the fact that the great disparity between the cost of manufacturing the company's products and its selling prices rendered the advanced rates a necessity.

The company further states that its policy from the beginning has been to reduce rates. Excepting increases in the rates for wholesale gas and wholesale power and for heating made during the last six years, there has been no change in this policy. The company will apply for authority to reduce its rates as soon as costs can be materially lowered. A notice to this effect has been sent to all customers, who also are asked to make use of the service with as much economy as possible.

HISTORY OF THE SALES MANAGERS' ASSOCIATION.

Review of Growth of Organization of Sales Managers of Large Central-Station Companies—An Account of Meeting Held.

By R. S. HALE,

Superintendent of Special Research Department, Edison Electric Illuminating Co. of Boston.

The idea of a convention of central-station sales managers started in the winter of 1909-10 when the growth of the electrical industry and of the National Electric Light Association and of the Association of Edison Illuminating Companies began to indicate the need of specialization. The Commercial Section of the N. E. L. A. was one development, but the Commercial Section took in companies of all sizes, while the sales managers of the large companies were finding that each of them had some problems similar to those of the other large companies, but quite different from the problems that formed the subject of the papers and discussions at the conventions.

The idea then occurred to the writer, and undoubtedly to others at the same time, that a small convention, almost small enough so that we could sit around a table as at a committee meeting, would be of great value. The sales managers of the large companies found themselves getting together in groups at the big conventions, but so much else was going on that the discussions were left unfinished. Why should we not meet by ourselves and not only have plenty of time but in addition have just the men we wanted? After talking the matter over with the sales managers of the different companies the writer took it upon himself to initiate and plan for a small convention of sales managers from the large companies only, with the hope that if the plan was successful it would be continued in later years.

It was seen from the first that the efficient way to get active and interested discussion was to have definite, even if short, papers on different subjects. Then the problem of publicity came up, and in order to avoid any possible criticism it was arranged that neither the papers nor the discussions should be made public and that the active managers of the big companies, such as Messrs. Edgar, Insull, Lieb and the others, who were closely associated with them, should be kept in close touch with all that was done, and should have a complete and immediate veto power in case the convention should ever show signs of departing from the paths of prudence and wisdom. It is interesting to note that this power was never exercised and though the reports of the meetings are presumably submitted to the executive of each and every company there has never been any disapproval of the work; in fact, quite the contrary.

The preliminary arrangements having been made, the first convention was called to meet at Briarcliff, N. Y., on July 11, 1910, and the companies were represented as follows: Edison Electric Illuminating Co. of Boston, R. S. Hale, H. W. Moses and L. R. Wallis; Edison Electric Illuminating Co. of Detroit, Miss S. N. Sheridan, B. G. Dennian and G. D. Slaymaker; Commonwealth Edison Co., Chicago, J. F. Gilchrist and E. W. Lloyd; Philadelphia Electric Co., J. W. Meyer and J. D. Israel; United Electric Co. of New York, J. F. Becker and T. B. Rhodes; Edison Electric Illuminating Co. of Brooklyn, T. I. Jones, H. G. Disque and Mr. Rubright; New York Edison Co., A. A. Pope and Mr. Tweedy; Cleveland Electric Illuminating Co., M. E. Turner and Mr. Davis.

The general plan of the meeting was substantially the same as at present, viz., to meet in the morning and evening of two successive days, leaving the afternoon for rest and recreation. A morning meeting on the third day was added in 1912. The meeting was so successful that a committee was appointed to arrange for continuing it. As a result, the second convention was held at Briarcliff, July 10-11, 1911, with the following additional companies: Union Electric Light & Power Co., St. Louis; Consolidated Gas, Electric Light & Power Co. of Baltimore; Po-

tomac Electric Co., Washington; Minneapolis General Electric Co. and Seattle Electric Co.

In 1912 the convention met at Association Island, N. Y., on Aug. 5, 6 and 7. The Seattle and Minneapolis companies omitted to send delegates, but the Toronto Electric Co. was represented by Parker Kemble. In 1913 the convention again met at Association Island (Briarcliff). The Toronto Electric Co. had dropped out, but Mr. Kemble brought in the Union Gas & Electric Co. of Cincinnati, and the Public Service Co. of New Jersey was represented for the first time.

Success Achieved By Consulting All the Delegates.

This fourth convention, like the first three,, was under the chairmanship of the writer, who is frank enough to say that he ran the first four conventions on his own authority, but made them a success only because he consulted every one he could beforehand, and did nothing without previously making sure that his action would be satisfactory to the delegates. At the 1913 convention the management was placed in the hands of E. W. Lloyd, to be assisted by a committee consisting of A. A. Pope and J. D. Israel.

In 1914 the convention was held at Association Island on Aug. 24, 25 and 26, under the chairmanship of Mr. Lloyd. In 1915, A. A. Pope was chairman and the convention met at York Cliff, Me., on Aug. 2, 3 and 4. The New York & Queens County Electric Light & Power Co. was added to the membership.

In 1916 J. D. Israel was chairman and the convention was again held at Association Island on July 31, Aug. 1 and 2. This year for the first time not only discussions but also the papers themselves were printed. The Public Service Co. of Northern Illinois was a new member, making 14 in all. At this convention Mr. Beardslee of St. Louis was chosen chairman for 1917, with G. F. Becker and Miss Sheridan on the committee. On account of the war no conventions were held in 1917 and 1918. In the winter of 1918-19, Mr. Becker was appointed chairman for 1919.

In 1920 the convention met again at the Island, with T. I. Jones as chairman, and at its close selected for the 1921 chairmanship R. H. Tillman of Baltimore, with R. R. Young and E. A. Edkins on its executive committee.

At this convention the idea of having a formal constitution and by-laws was discussed and gently laid on the table, leaving the rule as heretofore that the chairman and his executive committee can do anything they choose until their successors are elected, but that in fact they will arrange the program so that every one shall be satisfied and so that if possible the convention shall continue for the future as it has functioned in the past.

COAL SITUATION WITH NEW ENGLAND UTILITIES.

A survey of the coal situation among industrial concerns and public utilities of New England shows that the latter have an average of 3.8 weeks' supply of coal on hand, or 28.7% of the coal they should have. Under normal freight conditions these same utilities need an average of 13.2 weeks' supply at this time. This they consider the minimum needed to insure safety during the winter when freight conditions preclude securing an adequate supply, even when embargoes and freight tie-ups do not exist.

The utilities average but one-third the coal supply of the industrial companies, which average 9.4 weeks' supply. The industrials also average larger needs, requiring 22.7 weeks' supply at this time to be secure, even under normal freight conditions. The low stocks of the utilities as compared to the industrials results from the fancy prices which have been ruling for "spot" deliveries.

STANDARDIZATION OF CORD AND APPLIANCE CONNECTIONS.

Wiring Committee of N. E. L. A. Studying Various Types so as to Determine Form of Construction to Use as Standard.

The wiring committee of the National Electric Light Association has been working for some years on the question of standardizing connection between portable cords and appliances. The Associated Manufacturers of Electrical Supplies has been co-operating with the wiring committee on this matter and at the present time it would appear that there were three types from which the best will be determined by practical experience. These three types are the round prongs, the flat prongs with blade in line and the flat prongs with blades parallel to each other.

It has been suggested by some of the manufacturers that if any of the central stations have or could get any kind of record as to the relative number of times that the appliances give trouble at these points, viz., the connection between the appliance and the cord, such data would be of great value in finally determining which form of construction would be best as a standard for all of them.

R. S. Hale, chairman of the wiring committee, 39 Boylston street, Boston, is receiving reports on this subject from central-station companies regarding the total cases of trouble and the relative number of cases to the number of devices of each particular type of connection.

MANY INDIVIDUALS INTERESTED IN UTILITY STOCK.

The fact that ownership of stock in public utility companies is widely distributed and that a large part of the general public is directly interested in their success is shown by data recently compiled by the Bell Telephone System. The statement says:

The Bell System is made up of the American Telephone & Telegraph Co. and its associated companies. The American Telephone & Telegraph Co. largely owns the associated companies and has supplied most of the capital which has been used in building their properties. The American Telephone & Telegraph Co. in turn is owned by over 130,000 individual stockholders, including 24,000 employees. Their holdings, as a rule, are not large, over a third of them owning less than five shares each, and over nine-tenths of them owning less than 100 shares each. The average number of shares held by each stockholder is 32. These stockholders live in every state in the Union and come from all walks of life. Over half of them are women.

CONTRACTOR-DEALER

An Exchange of Ideas and Experiences on Advertising and Selling Methods, and Store-keeping for the Dealer in Electrical Goods

SUGGESTING USE OF ELECTRIC FAN IN FOOD-DRYING SEASON.

Style of Advertisement Prepared for Contractor-Dealers Who Advocate the Fan as an All-Season Convenience in the Home.

Contractor-dealers in the smaller cities, where they feel that individual retail advertisements in the local newspapers receive more attention than they do in the larger cities, are beginning to realize the importance of advertising the electric fan as an all-season aid and comfort in the home. While this realization is also true of the dealers in the larger cities, the latter usually make their advertisements effective by co-operating in a general advertising campaign which is sometimes participated in by the central-station company or the manufacturer or jobber, or all of them. In the latter case the advertisements are much larger and more attractive than the individual dealer can usually afford, and they either carry the names of all the co-operating dealers or the admonition to "get them at your nearest electrical dealer."

Dry Fruits and Vegetables With an Electric Fan

Save sugar and fuel by the cool electric fan method of drying fruits and vegetables.

The Government approves of this method. *You* will approve, too, when you find how easy it is.

Come in and let us explain fully. We'll show you how to cut your food expense.

(Your Name and Address)

Seasonable Advertisement Featuring the Electric Fan for Drying Food.

For the convenience of the individual dealer who desires to advertise the advantage of the electric fan for drying fruits and vegetables in season, the Society for Electric Development has designed a number of advertisements, among them being the one illustrated herewith. The original of this advertisement was designed for one column wide in the ordinary newspaper, being furnished in electrotype form with a mortise for inserting the name and address of the electrical store.

CAPITALIZING CURRENT EVENTS IN STORE AND WINDOW.

Contractor-dealers who can capitalize in some manner the important current events in their store and window displays may be sure of increasing the interest of the public in their establishment. Occasionally these events lend themselves to a convenient linking up with some one or more of the electrical appliances sold by the dealer.

To assist dealers in this connection one manufacturer is sending to contractor-dealers a newsy "broadside" in three colors, showing how and when the states ratified the woman's suffrage and prohibition amendments. Election data of the 1916 presidential campaign, condensed biographies of presidential candidates and their platforms are also included. The electoral vote for president and vice-president at every election in the country's history is given. In the upper left-hand corner is a view of a "C-H" switch on a toaster cord, with the caption, "Selected by the women on the platform of 'Convenience.'"

This "broadside" is intended to be displayed in the show window or in a convenient place on the wall of the store. It should have a ready appeal to all women since a majority of them will appreciate anything that will enlighten them in the exercise of their new privilege of the franchise.

ELECTRIC DISHWASHER SALES SHOW INCREASED DEMAND.

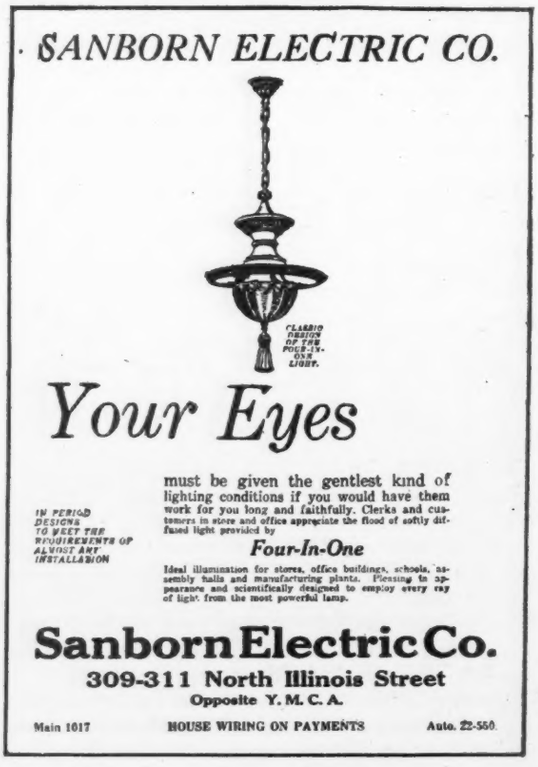
There have been electric dishwashers on the market for quite some time, but this season has shown the first general awakening of the housekeeper to its advantages in the home. As a result there have been more electric dishwashers sold to residences thus far this year than the combined sales of this appliance during the three previous years. There are now ten or a dozen makes of electric dishwashers on the market.

Business Hints for the Dealer

Lighting Fixture Dealers Can Profit From Optical Campaign by Launching One for Better Lighting to Prevent Eye Diseases

No trade has made greater progress during the past few years in the art of advertising than optometrists. Opticians may not be as large users of space in the daily newspapers as some other industries, yet they are at least consistent advertisers. One can hardly pick up a representative newspaper these days without coming across the advertisements of several opticians, urging the public to take care of its eyes.

Indianapolis is probably typical of the advertising being done by opticians. The Optometrical Society of Indianapolis, composed of a score or so of leading members of that trade, has for the past year conducted a co-operative campaign in the daily papers, emphasizing the need of proper attention for the eyes. This has by no means ended the advertising activities of the opticians, for all of them have done further advertising as individuals, following up the advantage gained by the co-operative campaign. The result of all this has been a tremendous public interest in the care of the eyes, and this was evidenced when such pressure was brought to bear on the school administration that a clinic was established in connection with the public schools, where pupils, especially those who seemed backward, might be given thorough examinations with a view to detecting any eye trouble.


SANBORN ELECTRIC CO.
CLASSIC DESIGN OF THE FOUR-IN-ONE LIGHT.
Your Eyes
must be given the gentlest kind of lighting conditions if you would have them work for you long and faithfully. Clerks and customers in store and office appreciate the flood of softly diffused light provided by
IN PERIOD DESIGNS TO MEET THE REQUIREMENTS OF ALMOST ANY INSTALLATION
Four-In-One
Ideal illumination for stores, office buildings, schools, assembly halls and manufacturing plants. Pleasing in appearance and scientifically designed to employ every ray of light from the most powerful lamp.
Sanborn Electric Co.
309-311 North Illinois Street
Opposite Y. M. C. A.
Main 1617
HOUSE WIRING ON PAYMENTS
Auto. 22-550

An Electrical Advertisement That Follows Up an Optician's Campaign for Care of the Eyes.

All of this seems rather obscure and unrelated to the electrical industry until one reflects that the aims of the two trades are parallel, to some extent at least. The optometrist seeks to cure existing disease, while the dealer in lighting devices has a far greater opportunity—that of doing preventive work. Dentists and physicians are calling for less treatment of existing diseases and more work designed to prevent these diseases, and this course is logically the one that should be followed. As far as the eye is concerned, the dealer in electric illuminating devices can do work that will prove both beneficial to the public and profitable to himself.

Where the Electrical Dealer Follows Up a Good Lead.

The fact that optometrists have already done a big volume of advertising means that the field is plowed for the electrical dealer. He doesn't have to do the preliminary work of impressing the public with the importance of their eyes, and the relation of proper lighting to conservation of the eyesight.

The Sanborn Electric Co. of Indianapolis, Ind., is one of the concerns in the electrical field which realizes the truth of these remarks. The company is a consistent user of newspaper space to tell its story to the public, and it has just as consistently pointed out the relation of good lights to the eyesight.

Dealer Strikes New Note in Advertising Illumination.

Some of the Sanborn Electric Co.'s recent advertising has struck a new note. It was realized that the use of the floor and table lamp has become so general that a great many homes are now properly lighted, and that the possibilities in this direction are not so marked as in the industrial and commercial field. The company touched on this fact when it said, in a recent advertisement, that "clerks and customers in store and office appreciate the flood of softly diffused light, ideal illumination for stores, office buildings, schools, assembly halls and manufacturing plants."

This idea opens up a wide field, appealing, as it does, to the business sense of employers. The latter have discovered that "welfare work is something that puts more money in the pay envelope of the employe and more money in the bank account of the employer." And proper lighting conditions may be classed as a phase of welfare work which will enable office and factory workers to do more and the employer to obtain a greater output without any additional expense of moment. Employers, therefore, can easily be sold on the idea of efficient lighting.

The effect of correct illumination on the customer is worthy of even greater consideration and an argument of this kind is certain to win

the attention of the operator of any store. It has been substantially proven that lights attract human beings just as surely as they do moths, and an even illumination on the interior of a store is certain to stimulate the volume of buying done in that store.

This is by no means an abstract consideration. The Retail Research Institute, comprised of a score of department stores throughout the country, has taken the initiative in investigating the values of light and it has made a good many important recommendations to its members along this line. While this organization is in the vanguard when it comes to scientific research, other merchants are no less interested in proper illumination and its results and will listen just as readily when the subject is broached.

As indicated, optometrists have helped create public interest by their consistent advertising. The field has been cultivated and dealers, who, like the Sanborn Electric Co., develop this interest along the right lines, may properly feel that the possibilities are unlimited.

SELLING LIGHTING FIXTURES WITH AID OF SHADOW BOXES.

Recently there has been evidence of a desire on the part of some contractor-dealers to get away from the general method of displaying lighting fixtures from the ceiling. This is particularly true of those who have small and narrow stores. In practically every case these deviations are proving successful from the point of view of sales as well as attractiveness.

It is generally acknowledged that too many varieties of decorative bowls suspended in a group, and all lighted at once, result in more or less confusion on the part of the customer who is trying to make a selection. Where there is such confusion it results in prolonging the sales effort of the clerk. Frequently a customer, unable to decide because of so many styles in a group, postpones the purchase to look elsewhere, and then fails to return. This does not mean, however, that ceiling displays of fixtures are a failure. Many of them are otherwise, but it depends upon the store arrangement and general dimensions of the space they occupy.

Herewith is presented a view of the interior of the store of the Mid-City Electrical Construction Co., Chicago, showing the arrangement of a shadow-box case along one wall of a narrow salesroom. While round-top tables are not advocated for the display of small appliances, the row of tables and chairs directly in front of the shadow-box case in this store adds to the attractiveness and invites ease and comfort while the customer is selecting the purchase.

CONCESSION FOR ELECTRIC OPERATIONS IN VENEZUELA.

It is reported a concession has been granted by the Venezuelan government to an American citizen for the construction of an electric railway from San Felix, on the Orinoco river, to the Guasipati gold fields of southeastern Venezuela. Arrangements have been made for the rental of water power for hydroelectric energy from the falls of the Caroni river, located about three miles from the town of San Felix.

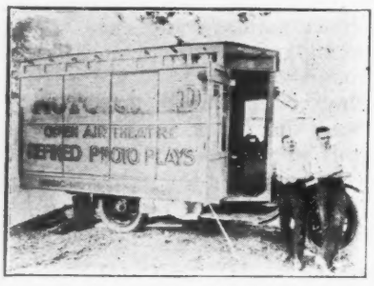
Lighting Fixtures Displayed in Shadow Boxes at Store of Mid-City Electrical Construction Co., Chicago.

NEW APPLIANCES

Newly Developed and Improved Electrical and Mechanical Apparatus, Appliances, and Devices Now Being Placed on the Market

Motorized Open-Air Theater.

Motion pictures on wheels is one of the latest developments designed by Messrs. De Pathy and Bergstrom of Hartford, Conn. In a motorized open-



Motorized Traveling Theater.

air theater bus are a motion picture machine, equipped with a 32-volt mazda lamp,, a 1-kw., 40-volt, 1700-r.p.m. Westinghouse d-c. generator and miscellaneous equipment. The generator is driven by a fabric band on the engine flywheel. The pictures are projected through an opening in the rear of the bus on a screen at a 40 or 50-ft. distance.

Mine-Locomotive Headlight With Spring-Suspended Case.

To withstand the severe conditions under which they are used, the mine locomotive headlights placed upon the market by the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., have been designed so that the incandescent-lamp case is carried on a spring suspension which adequately protects the filament from breakage due to vibration and jars. The case which contains the socket and lamp is entirely suspended from six springs. These springs are located symmetrically and

Spring-Suspended Mine Headlight.

are in tension. Thus the spring suspension is equally effective in all directions, assuring the longest possible lamp life.

The new Westinghouse headlight responds to the slightest pressure in any direction assuring perfect cushioning. The frame, case and cover are made of high grade cast iron, heavy enough to withstand a great deal of abuse. As the lens holder is fitted to the case with a threaded joint and rubber gasflets, the headlight is tightly sealed and, therefore, suitable for use in gaseous mines.

Where headlights are to be operated on circuits of more than 250 volts a resistance is supplied. This resistance is housed in a full cast-iron case of sturdy construction.

Electric Device for Displaying Advertising Cards.

For displaying advertising cards in shop windows, a motor-driven card-display machine is being manufactured by the United Advertising & Sales Co., San Francisco. By this machine 24 cards of standard streetcar size are continuously rotating, individual cards sliding into view at definite intervals.

Electrically Operated Sign-Card Machine.

These machines are of all-metal construction and attractive in appearance. Chains at both ends of the machine are driven by a Westinghouse type CA, 1/20-hp., 110-volt, 1750-r. p. m. motor through a horizontal shaft, worm gear and belt.

The machine originally brought out was constructed largely of wood, but, later, dies and patterns were made whereby all parts of the machine are now being constructed of metal, making a very substantial machine. An imitation wood-grain finish has also given way to a black enamel finish.

Portable Desk Lamp With Removable Shade.

The Faries Manufacturing Co., Decatur, Ill., has recently added a new green-glass white-lined interchangeable shade, shown in the accompanying illustration, to their "Verdelite" line of portable electric lamps. One of the special features of this unit is the holder having a slot which slides down over the attachment at the top of the lamp and holds the shade firmly in place. This arrangement also permits the shade to be instantly removed by simply placing one hand on each end of the shade and lifting it out of position. This feature eliminates the necessity of the support-

"Verdelite" Portable Lamp With Removable Shade.

ing fork or any other visible metal parts used in supporting the shade, and makes cleaning more easy and convenient.

Safety Electric Lighting Sets for Christmas Trees.

Safety as well as decorative appearance has been considered in the development of the "G-E Christmas Arborlux," a multiple-connected lighting set designed for Christmas trees by the General Electric Co., Schenectady, N. Y. In the new set the lighting cord is wired in multiple rather than in series, so that if one lamp burns out or is broken the others are not affected.

The "Arborlux" set includes a trans-

"Arborlux" Christmas Tree Lighting Set.

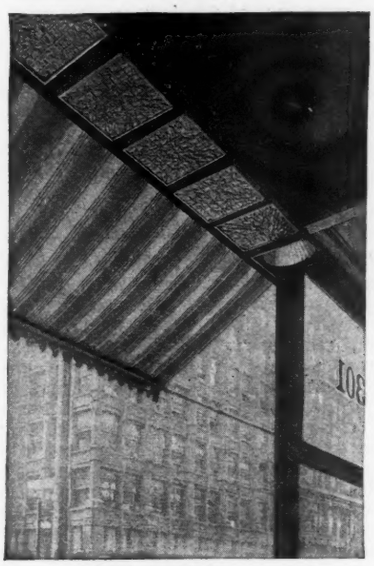
former which can be attached to any 110-volt, a-c. lighting circuit by means of a 6-ft. cord and plug, and a main cord, 9.5 ft. long, with five arms of four branches each. The 20 branches

are made of twisted twin-conductor wire which is finished in green, each branch being tipped with a miniature lamp the colors of which are ruby, blue, green, orange and frosted white glass. The joints where the branches and the main cord join are bound together with junctions of molded composition which protect them from any mechanical strain. The lamps furnished with the set, 21 in number, are known as the mazda G-6.

The transformer is equipped with three terminals, giving 10, 14 and 24 volts respectively, so that it may be used to operate electric toys when not in use for lighting the tree. As the terminals on the string of sockets are made to fit only on the 14-volt connection, it is impossible to burn out the lamps by making a wrong connection. The 24-volt connection will supply sufficient power to run the largest electric toy made.

Equipment for Producing Colored Window Lighting.

A development that promises to be an outstanding feature in the practice of show-window lighting, and one that will



View Showing a Number of "Color-Ray" Fixtures Installed in Show Window.

have an influence upon every other branch of illuminating engineering, has recently made its appearance. The device is designed to produce colored lighting effects and will be placed on the market shortly by the National X-Ray Reflector Co., Chicago. Window trimmers and illuminating experts have, of late, been experimenting to find some practical means of producing colored lighting effects in display windows. In the past many different schemes have been used to produce the desired color effects.

Incandescent lamps have been superficially colored with various kinds of "lamp dip," but this has proved unsatisfactory because the heat of the lamp rapidly fades out the color. The use of natural-colored-glass type C lamps has also been tried, but the colors fade out rapidly and it is difficult to gain the desired effects and make them permanent. In some cases a sheet of colored glass has been suspended below the reflector,

Illustration of Method of Installing Slide Holder.

but the heat of the lamp on the glass causes some difficulty.

The National X-Ray Reflector Co., who devote a large part of their research work to the proper lighting of show windows, has recently developed a means of producing colored light in show windows which is said to have solved the problem of color effects. This should prove very popular among those interested in window decoration. The device which they present will be called by the trade name "Color-Ray," and consists of a metal frame which fits over the mouth of the X-Ray "Jove" and "Jupiter" reflectors. This frame supports a slide of colored gelatin which is held in place by fine steel meshes. The slide slips in the frame and, therefore, the color can be changed readily. When the ordinary white light is desired the slides may be left out altogether, while the frame which supports them may be left on the reflector, it being very inconspicuous and in no way interfering with the amount of light that is produced.

The frame is fastened to the reflector by means of an asbestos-cord harness designed so that it may be attached without disturbing either the reflector or the lamp. This is a decided advantage, as the color unit can be put on in a few minutes at practically no expense of installation. Colored gelatin is a medium that has been found not to fade rapidly under the heat of the type C lamp. The color-frame which holds the gelatin screen is so designed that there

Illustration Showing Method of Replacing Colored Slide.

is ample ventilation for the complete unit.

Another important consideration is that the gelatin used is noninflammable. The standard colors that are used have been selected only after a careful consideration of the requirements to be met. To the window trimmer or to the merchant who is interested in display-window advertising, the value of this innovation will be seen at once. There is nothing that will attract the attention of the prospective purchaser to a window display so quickly as will light of the proper color upon the merchandise displayed. By the use of the various colored slides, which are supplied by the manufacturers, almost any combination of colors can be secured. In some of the trial installations, where a high intensity of light was desired, two rows of reflectors extending across the whole window were used which allowed the color combinations to be made the most of.

The uses to which colored light in windows can be put are quite varied. Their extent depends only upon the ability of the window trimmer. For instance, at Christmas when the dominant tones in the window are brilliant red,

Reflector With Color Holder in Place.

bright gold and silver tinsel, a brilliant red light upon the picture will enhance its attractiveness many fold. Sunlight effects, the atmosphere of moonlight, marine blues or heavy purples can be obtained at the will of the artist who plans the display. In some instances the colors can be worked in connection with a flasher which will change the color combinations constantly. The attention-drawing effect of this method can be readily seen by those whose profession it is to attract attention.

E-Z Wire Fixture Stem.

Simplicity of construction and ease of attachment are features claimed for the "E-Z Wire" stem number 1890 now being placed on the market by the Peerless Light Co., Chicago. There is nothing to assemble. It is made of one piece, the heavy loop being built in. There is no necessity for pipe, casing, loop or finisher.

Being made of stamped-steel tubing it is light and strong. It presents an attractive appearance in keeping with details of the fixture in which it forms a part whether massive or light and graceful in construction.

Farm-Lighting Plant With Extra Pulley for Power.

The model SAR 1.5-kw. farm-lighting plant is a compact, powerful, smooth-running unit of which the engine develops full four horse power and the generator 1500 watts, according to the manufacturer. The engine is cooled with a radiator and Sirroco fan. This plant was developed as a supplement to the line of SA 1200-watt plants to fill recognized needs for a bigger, sturdier plant with a larger reserve power. The SAR plant makes an ideal installation where it is desired to operate a milking machine or other heavy power-consuming devices which would overload a smaller plant.

These plants are made for operation at 32, 65 or 110 volts, the generator being rated at 37.5, 18 and 13 amperes for the different voltages. Batteries supplied with the 32-volt sets are rated at from 80 to 320 ampere-hours, as desired, on the eight-hour basis. The sets for higher voltage have smaller batteries, but all have higher ratings when operated on intermittent service. These equipments are made by the Perfection Storage Battery Co., Chicago.

Self-Adjusting Arms for Local Lighting Fixtures.

The accompanying illustration shows the details of the disc joints used in the self-adjusting fixture arms made by the Franklin Specialty Manufacturing Co., Inc., New York City. Where the wire enters the disc it is fastened in place with insulating cement. It is then coiled once around the fibre sleeve surrounding the screw. In one extreme position the loop of wire is coiled closely around the fibre sleeve, and in the opposite extreme position the loop of wire is expanded, but never enough to come in frictional contact with the rim of the disc. Where the wire is carried out through the opposing disc it is again made secure with insulating cement to prevent any possibility of slipping or chafing endwise. The inner walls of the disc are protected with heavy insulating varnish.

Arms of various lengths and for mounting in different positions are assembled with these disc joints. These arms are used for suspending lamps over drawing boards, in machine shops, tailor shops, printing shops, garages, hospitals, etc. Rolling floor stands adapt these arms to a variety of uses in places where the maximum of portability is required. Diagnostic wall and chair brackets, utilizing these discs for flexibility, are designed especially for service in doctors' offices.

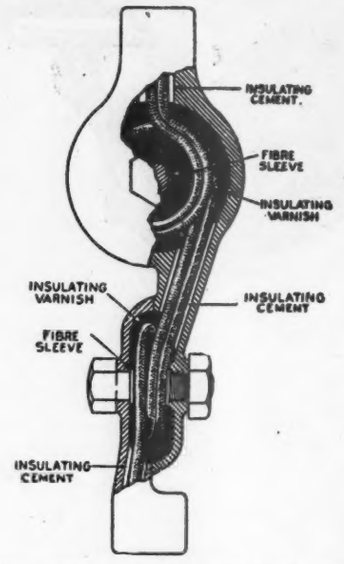


Illustration Showing Details of the Universal Friction-Disc Joint.

The accompanying illustration shows an installation of lighting equipment in one of the plants of the Sweet Orr Overall Co., Newburg, N. Y. The manufacturer of this equipment calls particular attention to its adaptability to various types of photographic work.

View of Sweet-Orr Overall Factory, Showing Anderson Self-Adjusting Arms.

Semi-Indirect Lighting Unit.

The "Mefcolite" semi-indirect lighting units made by the H. S. McFaddin & Co., 38 Warren street, New York City, are particularly suitable for service in hospitals, public and office buildings and in all other places where substantial construction and low maintenance costs are desirable.

The glass bowl is held securely in a strong adjustable ring which is locked in position by one of the supporting arms without the use of screws or other clamping devices. Should the bowl be fractured it cannot fall, as it is supported on its entire circumference. The rings are adjustable in diameter and will fit any type or make of bowl of corresponding size.

The supporting rods are adjustable in length by means of a positive indicating locking device, and when assembled have the appearance of small link chains. The supports have a narrow edge toward the light, which practically eliminates shadows on ceiling. They also permit the use of any type or size of lamp in any unit. It is therefore possible to increase or diminish illumination without making alteration in the fixture. The bowls can be cleaned without removal from fixtures by simply unhooking any one of the supports.

A Flashlight Without Batteries.

The "Neverfail-Dyn-O-Lite" is a hand flashlamp now being marketed by the Dyno Electric Appliance Co., 516 Fifth avenue, New York City. This lamp requires no batteries or other external electrical application. By means of a permanent-field multipolar magnet a brilliant and far-reaching flash of 8 to 12 seconds' duration is produced by the pulling of a chain. Repeated operation of the chain prolongs the flash. The lamp is self-contained in an indestructible metal case and is impervious to atmospheric conditions. It may be suspended from the neck, leaving one hand free while the other operates the chain. It is useful in all emergencies where a flashlight is required, as in meter reading, automobile or shipboard emergency light, messengers, postmen, deliverymen, inspection and many other purposes.

Ajax Plural-Socket Plug.

The Ajax is a small two-outlet plug especially designed for taking a lamp and an appliance from the same socket. The lamp will be taken off in the same straight line as before, and only 2.25 ins. from the socket. The second outlet is at an angle of 45 deg. from the first, and the bakelite, of which the plug body is made, is so molded that any shade that fits the ordinary brass socket may be placed on this plural plug. Furthermore, the plug is smoothly polished, of a dark maroon color, only 3.5 ins. in length, weighs one-quarter of a pound, and is altogether unobtrusive and graceful in the discharge of its double duties. There are no screws or parts to loosen up with wear. The light and the curling iron in the bathroom, the lamp and the

fan on one's desk and the lamp over the dining room table and the grill can be accommodated in couples by this one small plural socket made by the Ajax Electric Specialty Co., St. Louis.

Dining-Room Chandelier With a Deep Glass Bowl.

Styles in lighting fixtures change almost as often as the seasons, but of the many designs that have been produced none are superior to the old dome in producing a feeling of comfort and satisfaction while enjoying a good meal. The white light on the linen and the soft light and colors on the walls and ceiling give the dining room a hospitable charm.

The accompanying illustration shows a new dining-room fixture, recently brought out by the Beardslee Chandelier Manufacturing Co. of Chicago, which has many of these good features. The

Beardslee Dining-Room Chandelier.

specially designed glass shade is ornamented with flowers and leaves in many colors and is supported by a hand-wrought iron holder finished in polychrome on a rusty background, the colors being the same as those used on the shade. The holder supports the shade from the inside, thus preserving its entire outline and making possible a better proportioned fixture. The lamp is hung high within the shade so that the direct rays cannot strike the eyes of a person sitting at the table, hence a type C lamp may be used to advantage. The manufacturer states that this new chandelier sells at a moderate price and has had much favorable comment.

Self-Cleaning Industrial Lighting Fixtures.

In foundries and similar locations a maximum cleaning interval of seven days is recommended by many authorities. Even with such frequent cleaning typical lighting equipment is subjected to an average depreciation of about 33%.

It is next to impossible to clean foundry lighting equipment every few days; the fixtures hang high and are inaccessible to the last degree. Also the job is dangerous, awkward, disagreeable and expensive to perform. In cleaning such

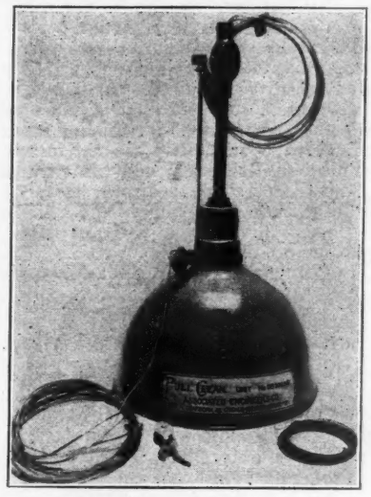
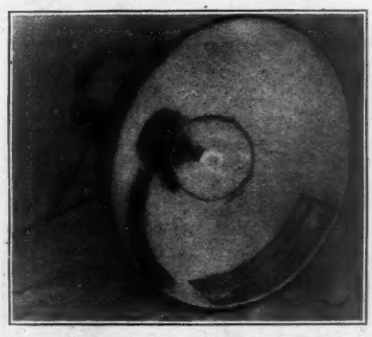


Illustration Showing Device for Operating Cleaning Wipers.

fixtures much dirt is dislodged and drops down on the molds, machines and work beneath and hence can be done only at certain restricted hours, if at all. And yet, if it is not done, the workmen that depend on artificial light may waste much of their time every day because of their inability to see into, around and underneath the objects or machines they are working with.

To meet this situation, the "Pull Clean" fixture has been designed and is marketed by the Associated Engineers Co., Inc., Chicago. It compels the workman to clean his lighting fixture at least twice a day whether he wishes to do so or not. Lighting the fixture automatically cleans it.

The cleaning device consists of two wiping blades, one that rotates against the interior of the reflector, and one that rotates against the lamp bulb. As



"Pull Clean" Unit Showing Cleaning Wipers.

the stem switch is pulled, these two blades come into action and sweep the dirt off lamp and reflector by a complete revolution. The blades never reverse. Such frequent cleaning never allows dirt to cake on the reflector, and the accumulation of a few hours is never sufficient to annoy workmen in dropping down on the work below. The tendency is rather for the finely divided dirt to float away. The "Pull-Clean" industrial fixture is especially suitable for service in iron and steel foundries, wood-working shops, saw mills, railway round houses, cement mills, flour and cereal mills, stone yards, lime kilns, boiler houses, coal-handling yards, blacksmith shops, heavy machine shops, grinding and polishing rooms, feed and grist mills and other similar locations.

The fixtures are delivered completely wired and assembled, each in an individual carton, with full directions for erecting. They are supplied in a suitable size for 300 to 500-watt lamps.

Lighting Unit for Banks, Stores and Similar Locations.

"Supreme" Reflectolytes, supplied by The Reflectolyte Co., St. Louis, embody advanced ideas of light control and diffusion. They utilize and control the rays emitted by the light source, converting them into a flood of soft, cheerful, well-diffused light of a color and quality suitable for indoor illumination. These units, the type S. I. unit being shown in the accompanying illustration, are made in sizes to accommodate lamps of from 75 to 500-watts capacity.

Plain and ornamental, single, multiple,

Type S. I. Reflectolyte.

and candle units, with brackets to match, are made in such a variety as to provide for the complete equipment of office buildings, stores, schools, churches, banks, hotels, theatres, hospitals, etc. A concealed porcelain-enameled steel reflector redirects the light from the upper portion of the lamp and spreads it out and down towards the locations where it is useful. Special ventilating openings provide for the cooling of the interior of the unit and, at the same time, prevents the entry of bugs and other foreign materials into the body of the equipment.

Low-Resistance Regulating Unit for Cooper Hewitt Lamp.

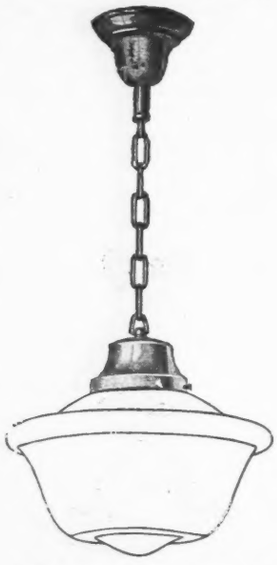
The Cooper Hewitt Electric Co., Philadelphia, has developed a new type of auxiliary for use with their a-c. lighting units which has raised the power-factor of these lamps from 52 to 85%. This has been accomplished by replacing the choke coils of the former auxiliary by a positive low-resistance unit. Further advantages of the new auxiliary are a saving of 14 lbs. in weight over the old

type, and an increase in the allowable voltage variation. This increase in voltage variation is allowable, since the new lamp has a regulation of 25%, while that of the old type was only 12%.

The input to the new lamp is 430 watts, and the candle power has been increased about 12%. The lamp is adapted to a-c. circuits only, and can be used only on its specified frequency and within its own voltage range.

Wakefield "Red Spot" Fixture Suspensions.

The Ivanhoe "Trojan" unit, shown in the accompanying illustration, is the latest commercial unit for which "Red Spot" suspensions have been designed by the F. W. Wakefield Brass Co., Vermilion, O. Wakefield "Red Spot" suspensions are high in quality, being



"Red Spot" Suspension Applied to a "Trojan" Unit.

made of heavy metal and carefully finished. They are packed in substantial cartons for safe and easy handling.

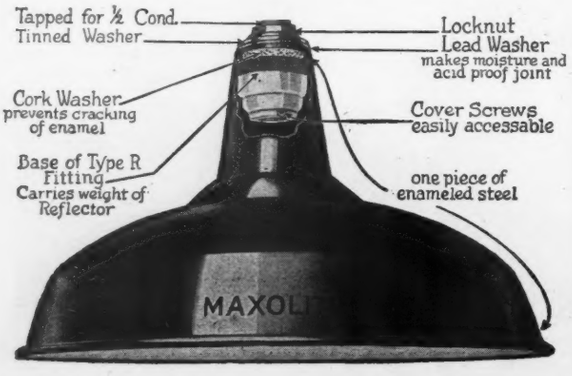
These suspensions are also made for the Ivanhoe "Phoenix" and "Ace" units, and for many others. Harmony, strength, durability and pleasing appearance are some of the qualities claimed for this equipment.

Industrial Fixture for 200-Watt Type C Lamp.

The "Maxolite Diffuser" has been designed to meet the demand for an industrial fixture which will have high efficiency and uniform light distribution combined with an intensive brilliancy so low that it will not unpleasantly affect the eye. This unit is made particularly for use with a 200-watt type C lamp, as this type of fixture, properly spaced so as to eliminate shadows and give uniformity, requires a 200-watt lamp to provide the desired amount of light. The "Maxolite Diffuser" is suitable for service in machine shops, textile mills, woodworking plants and all other places where close work is done or a fairly high intensity is required.

The unit is suspended by a cast-iron holder tapped for a 0.5-in. conduit stem. The socket is held in place by screws and may be easily removed for wiring. A 22-in. steel shade redirects most of the light from the lamp and gives shadowless illumination without glare, according to the manufacturer.

This equipment is being marketed by the Central Electric Co., Chicago.



Maxolite Diffuser for 200-Watt Lamp.

Electrically Wound Time Switch.

Circuit opening and closing at definite times is becoming more and more a factor in the design and construction of electrical equipment and appliances. Lighting circuits or individual lamps are controlled by time switches, and many cooking devices are equipped with time regulating apparatus. To meet the needs of such an appliance, the Albert & J. M. Anderson Manufacturing Co., Boston, is now manufacturing an electrically wound time switch. Such an appliance may be maintained in service for a long period of time without being given regular attention.

"Mogul Obround" Condulets.

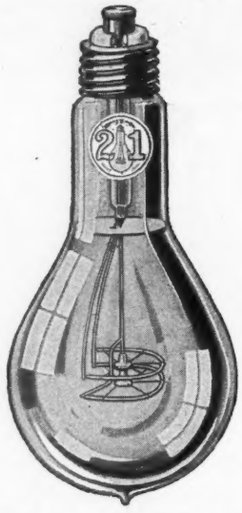
Four sizes of composition and cast-iron covers are made for the new line of condulets being made by the Crouse-Hinds Co., Syracuse, N. Y. These condulets, known as "Mogul Obround" condulets, are made in eight types and in sizes ranging from 1 in. to 4 ins. The special features of this line are unusually long cover openings and large wiring chambers.

Electrically Operated Appliance for Extracting Fruit Juices.

For extracting juices from fruits, such as oranges and lemons, an electric motor-driven fruit-juice extracter has been placed upon the market by the Standard Supply & Equipment Co., Philadelphia, for use at soda fountains, lunch counters, etc. The motor can be operated on either direct or alternating current and is connected to a source of energy through a cord and ordinary socket plug.

Incandescent Lamp with Two Filaments.

The Whitelite Electric Co., New York City, makers of nitrogen-filled lamps, are now manufacturing an incandescent lamp with two filaments instead of one. This new product is known as the "Dualite." The "Dualite" is placed in the ordinary socket in the same manner as the common type of lamp, and looks and operates almost like any ordinary light until it has burned out. Then the bulb is unscrewed from the socket, but, instead of being thrown away, a little cap is removed from the end of the base and the lamp is again put back in the socket. The removal of the little cap from the base brings the terminal of the second filament into place and allows the same lamp to be put back into service.



"Dualite" Lamp With Two Filaments.

Both filaments are of equal wearing qualities and, according to the claims made, the "Dualite" with its two filaments has twice the service life of the common single-filament lamp. One filament is mounted in the bulb above the other, and the only manipulation required by the user is to remove the little cap after the first burnout of the lamp. Aside from the economy claimed for such lamps, it is stated that there is much less need for the carrying of a stock of renewal bulbs by the user.

Long-Bodied Connector Plug for Attaching Appliances.

With a view to convenience in attaching household electric appliances to the ordinary lighting fixtures, particularly of the pendant type, a long-bodied connecting plug has been placed on the market by the B. & W. Specialty Manufacturing Co., 100 Boylston street, Boston. The body of the connector, extending 3.5 ins. beyond the plug, is of insulatnig material and permits the attachment of appliance cords without the necessity of removing the shade from the lighting fixture.

This connector was designed by an appliance salesman who saw the necessity for some easy means of connecting his appliances to the ordinary fixture without disturbing the shade. He found that it facilitated the closing of his sales because the customers appeared to appreciate its obvious convenience.

ACTIVITIES IN THE TRADE

Business Developments, Sales Agencies, Trade Literature and Miscellaneous Items Concerning Electrical Manufacturers and Allied Business Interests

Southern Electric Co., 16 Light street, Baltimore, is having plans prepared for extensions and improvements in its four-story building at 7 South Gay street.

Crown Chandelier Co., 103 Mott street, New York City, manufacturer of electric and gas fixtures, has increased its capital from $15,000 to $60,000 for expansion.

Westinghouse Lamp Co., Bloomfield, N. J., plans to erect a four-story factory, 100 by 200 ft., on La Salle street, Indianapolis, Ind., at an estimated cost of $2,000,000.

Monarch Refillable Fuse Co., Inc., Jamestown, N. Y., recently increased its capital stock for the purposes of expanding its business. Plans are under way to erect a building next year.

New Jersey Gas & Electric Appliance Co., Newark, N. J., recently incorporated with a capital of $125,000 to manufacture electric and gas equipment, has leased property at 36½ New street for a local establishment.

Appleton Electric Co., 230 North Jefferson street, Chicago, has issued bulletin No. 14, which lists a complete line of solid and sectional switch boxes with bevel and square corners, furnished for loom and flexible conduit, and also 0.5 and 0.75-in. rigid conduit.

M. W. Kellogg Co., 117 West Side avenue, Jersey City, N. J., manufacturer of power-plant piping, fittings, etc., is having plans prepared for the erection of three shops to be located in the Droyers Meadow district. A power plant for factory service will also be constructed.

International Western Electric Co., New York City, has sold the eight-story and basement building, 60 by 100 ft., occupied by it at 152-56 West 36th street. The lease runs to Jan. 1, 1921, and in the meantime the company is arranging the removal of its works to a new location.

Porcelain Insulator Corp., Lima, N. Y., is constructing a seven-kiln plant for producing high-tension porcelain insulators, together with a complete line of transmission accessories such as pins, clamps, etc. All of the equipment has been purchased and is on the ground, together with the raw material, and the company expects to be in a position to ship insulators shortly after Jan. 1, 1921.

General Electric Co., Lynn, Mass., has awarded a contract to C. W. Wright, Security Trust building, for the erection of a one-story addition to its local plant, 180 by 220 ft. The new building will be an extension to Building No. 67, and construction will be inaugurated at once. The company is also planning the erection of a five-story, reinforced-concrete addition to its plant at Pittsfield, Mass., 70 by 400 ft.

Standard Electric Machinery Co., 102 East York street, Baltimore, Md., has been formed by Guy K. Mitchell, Frank Stark, Carroll B. Roberts and Paul W. Terry, who were formerly connected with the Standard Electric & Elevator Co., Inc.

Cutler-Hammer Manufacturing Co., Milwaukee, has issued a new two-color, 16-page booklet, descriptive of the C-H magnetic gear shift. The booklet is written for the non-technical motorist and makes comparisons between this method of gear shifting, which is accomplished by a finger lever on the steering wheel, and the hand-lever method.

Chain Products Co., Cleveland, announces that A. B. Way has become affiliated with it in the capacity of district sales manager for New England, with headquarters at 150-152 Chambers street, New York City. Until recently Mr. Way was secretary and general manager of the Bridgeport Chain Co., and prior to his identification with the chain industry he had been connected with various New England manufacturing institutions.

Arrow Electric Co., Hartford, Conn., has purchased a building which will add 42,000 sq. ft. of manufacturing space to its plant. The building is of mill construction and its floors are of ample strength to carry heavy machinery, and the added space will relieve much of the congestion. The new structure is within 300 ft. of the main factory. With its floor space and that of the seven-story addition built six months ago, the total floor area is 200,000 ft. The Arrow company will begin to occupy the new building at once.

Roller-Smith Co., 233 Broadway, New York City, announces that its Philadelphia representative, the Perkins-LeNoir Co., 963 Drexel building, has added to its sales force G. C. Unger, who has had considerable experience in construction and installation of electrical apparatus. Mr. Unger will devote his attention to the various lines of electrical measuring, protective and control apparatus handled by the Perkins-LeNoir Co. and will specialize in the Roller-Smith products, comprising electrical instruments, meters and circuit-breakers.

Empire Lamp & Brass Co., 436 South Clinton street, Chicago, has issued a new catalog showing its line of portable lamps for various and special purposes, such as for the parlor, library, music rooms and boudoir uses. The descriptive matter is complete and each lamp is assigned to the "period" that, by reason of the general scheme of ornamentation employed, it illustrates. Intelligent selection can thus be made of lamps that agree with the period style of furniture of the room in which it is to be used.

Ideal Electric & Manufacturing Co., Mansfield, O., is erecting two buildings, one 160 by 425 ft., and the other 100 by 425 ft., which will be connected by craneway. A power house with about 300 to 400-hp. boiler units will be built shortly. The company recently bought a 25-acre site for these improvements.

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., is distributing miniature catalog 9-A-2, which describes industrial heating apparatus. Among the devices mentioned in this catalog are electric outdoor service foot-warmers, water-heating devices, immersion heaters electrically heated hot tables, industrial heating plates, dry-type glue pots, and dry soldering pots.

Windman-Goldsmith, Inc., Perth Amboy, N. J., has taken over the entire interests of what was formerly the Windman Electric Manufacturing Co., which has been manufacturing a ground clamp, a patented and approved electrical device for grounding circuits, and also sheet-metal stampings used in the electrical trade. The new corporation will manufacture such devices, together with other electrical wiring specialties.

Copper Clad Steel Co., 30 Church street, New York City, is issuing a series of circulars covering various kinds of "Copperweld" wire, one of which relates to power transmission and distribution. "Copperweld" is a copper conductor with the strength of steel, and it is claimed that this product gives every efficiency that the most critical engineer could demand and at a very much lower cost when used where maintenance, expressed in terms of tensile strength and breaking weight, is more important than extremely high conductivity; in power lines operated at very high tension, where conductors of large diameter are required to prevent corona losses; as overhead ground wires on transmission lines; for primary distribution circuits, particularly in the case of branch lines in high-tension networks; also of rural distribution circuits of comparatively short length serving relatively small loads; for the catenary in overhead electric railway construction; as a messenger or support for cables which are not self-supporting. It is also asserted that "Copperweld" is 50% stronger than galvanized wire and 60% stronger than solid copper wire of the same section; size for size it is from 7 to 10% lighter than solid copper wire, and costs less per pound. "Copperweld" wire permits a wider spacing of supports, which means saving in poles or towers, insulators, tie wires and labor. It is stated that rust and stretch are unknown in "Copperweld" lines. This material is furnished bare or weatherproof, with 40% or 30% of the conductivity o pure copper wire, as required.

PERSONAL MENTION

Biographical Sketches and Chronicle of Changes in Business Connections, Promotions and Other Personal News of the Industry

J. H. GRAEF, sales engineer of the Western Electric Co., Seattle, Wash., has been transferred to the Portland (Ore.) office.

BYRON H. HURD, assistant secretary of the California-Oregon Power Co., has been appointed acting secretary with headquarters at 507 Montgomery street, San Francisco.

C. C. CHESNEY has been elected president of the Engineering Society of Western Massachusetts. He is general manager of the General Electric Co.'s works at Pittsfield, Mass.

WALTER I. BROWN, for the past seven years secretary to B. J. Denman, president of the Tri-City Railway & Light Co., has been appointed to the office of assistant to President Denman.

F. J. BURD, formerly superintendent of the electrical work of the Franklin (Pa.) plant of the Cambria Steel Co., is now with the sales department of the Cutler-Hammer Manufacturing Co., Chicago.

GEORGE SHERRERD, formerly manager of the Philadelphia office of the Reliance Electric & Engineering Co., Cleveland, has been appointed manager of the New York office of the company.

W. M. ROSBOROUGH, assistant to the Pacific Coast manager of the National Lamp Works of General Electric Co., Oakland, Cal., has resigned to become connected with an eastern jobbing house.

C. A. MOORE, superintendent of the electrical department of the Cambria Steel Co., Philadelphia, has resigned to assume charge of the new power plant of the Berwind-White Coal Co. at Windber, Pa.

J. C. THOMPSON, former secretary of the California-Oregon Power Co., has been appointed manager of the Klamath Division of the company with headquarters at Klamath Falls, Ore., vice George J. Walton, who has resigned.

SAMUEL G. BOYD has been appointed manager of the electric motor department of the Fairbanks Co., Philadelphia. He was formerly manager of the New York sales office of the Reliance Electric & Engineering Co., Cleveland.

C. E. MAGNUSSON, professor of electrical engineering and acting dean of the College of Engineering at the University of Washington, has been appointed chairman of the Educational Committee of the American Institute of Electrical Engineers.

K. E. VAN KURAN, manager of the Westinghouse Electric & Manufacturing Co.'s Los Angeles office, will take an active part in the November meeting of the Pacific Coast Electrical Supply Jobbers' Association at Del Monte, Cal. The open day session of this gathering will be in charge of Mr. Van Kuran.

GEORGE F. WILLIAMS has accepted a position with the Androscoggin Electric Co., Lewiston, Me. He was formerly general superintendent of the Central Maine Power Co., Augusta, Me.

G. A. SAWIN, service engineer with the Public Service Electric Co., Newark, N. J., has resigned to become assistant to manager of the supply department, Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa. In his new position, Mr. Sawin

G. A. Sawin.

will take charge of the public utility work of the supply department. Mr. Sawin was graduated from Harvard University in 1901 with the degree of bachelor of science in electrical engineering. He then entered the meter engineering department of the General Electric Co. at Lynn, Mass., where he remained seven years, engaged chiefly in the design of alterating-current watthour meters. About twelve years ago Mr. Sawin joined the Public Service Electric Co. as meter engineer, having charge of the meter department of the company. Later he assumed illumination duties and became meter and illuminating engineer. In his latest position as service engineer his duties consisted of investigating and following every application for power from the time it was made until the customer was connected to the lines. Some of this work was finding out if added load could be carried on existing lines, how much equipment in transformers or line material would be needed, cost of giving service and other factors which enter into the consideration of giving service. Mr. Sawin is a member of the American Institute of Electrical Engineers, the National Electric Light Association and the Illuminating Engineering Society. He served on the N. E. L. A. meter committee from 1909 to 1912, being chairman of the committee the last three years. He was a member of the committee on metering and service methods of the Association of Edison Illuminating Companies from 1913 to 1920. He also served on the board of managers for the New York Section of the Illuminating Engineering Society.

A. A. DION, general manager of the Ottawa (Ont.) Electric Co., has been elected a member of the engineering section of the National Safety Council of the United States.

F. G. PARKER has been appointed secretary of the Portland Joint Pole Committee to fill the vacancy caused by the illness of James Curran. Mr. Parker was formerly assistant superintendent of distribution of the Northwestern Electric Co., Portland, Ore.

WALTER E. MILLER, for many years a member of the Wisconsin Trade Commission, has resigned to engage in consulting practice, which will include investigations and studies of steam and electric railway and other public utility problems. He has established his own new office at 413 Pioneer block Madison, Wis.

ROBERT M. GATES has been appointed managing engineer in charge of the Philadelphia district for the Lakewood Engineering Co., Cleveland. He is a graduate of Purdue University and is chairman of the Material Handling Section of the American Society of Mechanical Engineers. Mr. Gates will make his headquarters at 1034 Widener building, Philadelphia.

A. B. ZERBY, who has been connected with the Department of Publicity of the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., for about nine years, has been promoted to assistant to manager of that department. Mr. Zerby graduated from the Pennsylvania State College in 1911 with the degree of bachelor of science in electrical engineering.

DR. H. J. VAN DER BIJL, a member of the engineering department of the Western Electric Co. since 1912, has been appointed scientific and technical advisor to the Bureau of Mines and Industries of the Union of South Africa, and will leave soon to take up his new duties. He was instrumental in devising several of the improvements in telephone and telegraph instruments which the Western Electric Co. has brought forth the last few years.

OBITUARY.

PHILIP G. PUFFER died recently in Bridgeport, Conn. He was born in Worcester, Mass., and during his early business career was connected with the Bosch Magneto Co., Springfield, Mass., the Remington Arms-Union Metallic Cartridge Co., Bridgeport, and the Worcester (Mass.) Pressed Steel Co. At the time of his death he was purchasing agent of the American Tube & Stamping Co. of Bridgeport.

BUSINESS OPPORTUNITIES

News of Electrical Construction Projects in All Parts of the Country, Proposals Invited, Foreign Trade Openings and New Companies

EASTERN STATES.

Fall River, Mass.—A one-story power plant, 44 by 133 ft., will be erected by the American Printing Co., Water street, in connection with the construction of an addition to its local textile works. The entire project is estimated to cost about $160,000.

Springfield, Mass. — The United Electric Light Co. has awarded miscellaneous contracts for the completion of its new electric station at North and Carew streets.

Bridgeport, Conn.—The Frank Miller Lumber Co. will install new electric motors and other electric equipment, including wiring, at its plant. Contract for the work has been let to George J. Steinhart, local electrical contractor.

Hartford, Conn.—The Hartford Electric Co. has arranged for a note issue totaling $5,000,000, the proceeds to be used for extensions and improvements in electric generating plants, transmission and distributing systems.

Middletown, Conn.—The Goodyear Rubber Co. has perfected plans for the erection of a power house, 30 by 40 ft., at its local works.

Middletown, Conn.—The New England Enameling Co. has plans under way for extensions in its power plant, and for the installation of a new electric distributing system at its works. Westcott & Mapes, Inc., 207 Orange street, New Haven, Conn., is engineer.

New Britain, Conn.—The Connecticut Light & Power Co. has awarded a contract to W. E. Burk, Maple Hill, for the erection of its proposed one-story substation, 45 by 85 ft., at Church street and Corbin place. It will be of steel and reinforced-concrete.

South Norwalk, Conn.—The city council has completed plans for the erection of an addition to the municipal electric light and power plant, to be two stories, 20 by 40 ft. The installation will include a new rotary converter, transformers and other equipment, as well as a five-ton electric traveling crane. Westcott & Mapes, Inc., 207 Orange street, New Haven, Conn., is engineer.

Windsor Locks, Conn.—Connecticut River Co. plans to construct dam, 30 ft. high and 2000 ft. long, for power purposes. Address C. H. Tenney & Co., 201 Devonshire street, Boston.

Cranston, R. I.—The Narragansett Finishing Co. has filed plans for the erection of a new power house at its textile plant, 45 by 65 ft.

West Barrington, R. I.—The O'Bannon Corp. will build a pumping plant at its local works, 18 by 20 ft., for additional service in the power department.

Amsterdam, N. Y.—The Adirondack Power & Light Corp. is planning for the erection of a series of new power plants, to be located at Clifton Park, N. Y., and in various towns in Montgomery and Fulton counties. Application has been made to the Public Service Commission for approval of the project. J. Ledlie Hees is president.

Fowler, N. Y.—The St. Lawrence Transmission Co., Potsdam, N. Y., is perfecting plans for the erection of its proposed new electric generating plant at Fowler. Permission for approval has been asked of the Public Service Commission. F. A. Stoughton is president.

Glens Falls, N. Y.—Adirondack Power & Light Corp. applied to the Public Service Commission of the Second District for permission to construct an electric line in Clifton Park, Saratoga county, also in Montgomery and Fulton counties, and for approval of franchise granted. Address C. E. Snyder of the company.

Louisville, N. Y.—The Louisville Power Corp. has plans under way for its proposed new electric power plant here. Application has been made to the Public Service Commission for approval. W. F. Wilson is president.

New York, N. Y.—The New York Telephone Co., 15 Dey street, has construction under way on a new five-story exchange building, 227-43 East Thirtieth street, to cost about $1,000,000, including equipment.

New York, N. Y.—The Petroleum Heat & Power Co., 511 Fifth avenue, with plant at Stamford, Conn., has acquired property totaling about 4½ acres of land at Kingsland avenue and Newtown creek, Greenpoint, L. I., for the establishment of a new plant. The property has heretofore been held by the Rockland & Rockport Lime Co. A number of buildings are on the site and new structures will be erected. The total transaction involves about $500,000.

New York, N. Y.—The United Electric Light & Power Co. has acquired a block of land bounded by 132nd and 133rd streets, Locust and Walnut avenues, as a site for the erection of a new electric power plant, for a consideration said to be about $90,000. The property adjoins the present stations of the New York Edison Co. and the Consolidated Gas Co.

Yonkers, N. Y.—A power plant for general factory service will be erected by the Hudson Tire & Rubber Co., in connection with its proposed new local tire manufacturing plant. The project is estimated to cost about $350,000, including equipment.

Camden, N. J.—The Victor Talking Machine Co. has awarded a contract to the White Construction Co., 95 Madison avenue, New York City, for the erection of the proposed addition to its electric power plant.

Crosswicks, N. J.—The Board of Freeholders has been asked by Charles W. Brick for a franchise covering the construction of overhead and underground lines in certain parts of the county. Mr. Brick is planning for the erection of a new electric power plant at Crosswicks; a site has been selected and plans are under way. A distributing system to North Crosswicks is proposed.

Milltown, N. J.—The Michelin Tire Co. will install electrical and mechanical equipment in the proposed two-story and basement addition to its plant. Contract for erection has been let to the J. W. Ferguson Co., United Bank building, Paterson, N. J.

Newark, N. J.—The Mountain Ice Co., 131 Murray street, has filed notice of increase in capital from $1,000,000 to $4,000,000 for proposed expansion, including the erection of additions to its plant and installation of new equipment.

Newark, N. J.—Electrical and mechanical equipment will be installed in the new three-story re-inforced-concrete plant, 34 by 34 ft., to be erected by the New Jersey Ice Cream Co., 316 Mount Pleasant avenue, estimated to cost about $40,000. Voss & Lauritzen, 65, DeKalb avenue, Brooklyn, are architects.

Newark, N. J.—In connection with its proposed new automobile manufacturing plant on Frelinghuysen avenue, near the Newark-Elizabeth line, construction of which is well under way, the Willys Corp. will establish a large power plant for general works service. The initial station will have a capacity of about 6000 kw. J. V. Hall is general manager of the plant.

Trenton, N. J.—Plans have been prepared by the Cook Linoleum Co., East State street, for the erection of a new power house at its plant.

Trenton, N. J.—The city commission is considering a report tendered by Professor C. E. Clewell of the University of Pennsylvania, covering suggestions for extensions and improvements in the local street-lighting system. The commission has completed the installation of a new lighting system at Stacy Park.

Trenton, N. J.—The legislative commission recently appointed to make a valuation of the tangible properties of the public utilities in the state, has selected Ford, Bacon & Davis, 115 Broadway, New York, as engineers for this work.

Brownsville, Pa.—Electrical and mechanical equipment will be installed in the new two-story laundry plant to be erected by Rice Brothers on a local site. The project is estimated to cost $25,000.

Chambersburg, Pa.—The Letter-

kenny Telephone Co. has made application to the Public Service Commission for permission to operate a system in certain parts of Franklin county.

Clarksville, Pa.—In connection with its proposed new clay products manufacturing plant at this place, the Furness Corp., 343 South Dearborn street, Chicago, is planning for the construction of a new power plant. Plans are now nearing completion.

Mechanicsburg, Pa.—The New Era Hydroelectric Co., recently incorporated with a capital of $250,000, is planning for the erection of a new hydroelectric power plant in this section. The company is headed by Arthur G. Watkins, Mechanicsburg; Clem J. Randal, Harrisburg, Pa.; and R. U. Douglas, New Market.

New Castle, Pa.—The Lehigh Portland Cement Co., 718 Hamilton street, Allentown, Pa., is planning for the erection of a three-story power plant, 44 by 140 ft., at New Castle, in connection with several new works buildings to be erected here. The entire project is estimated to cost $200,000.

Uniontown, Pa.—The board of directors of the Uniontown Hospital has completed plans for the erection of a new power house at the institution, including a mechanical laundry plant. The work is estimated to cost about $30,000.

Washington's Crossing, Pa. — A campaign is under way to raise funds for the installation of an electric street-lighting system in this borough. The borough council is interested in the project.

Baltimore, Md. — The Maryland Causalty Co., Casualty building, is completing plans for the proposed power plant to be erected in connection with its new printing plant, administration building and other plant structures on Merryman lane. The entire project is estimated to cost $2,000,000, including equipment.

Mount Airy, Md.—Hagerstown & Frederick Railway Co., Hagerstown, Md., plans to erect one-story substation, 25 by 75 ft., at this place. Address M. A. Pooler, general manager.

Perryville, Md.—The Public Service Commission has granted permission to the Havre de Grace Electric Co. to acquire the interests of the late John H. Harlow in the Perryville Electric Co., giving the purchasing company control of this organization.

Washington, D. C.—The Ordnance Department is having plans prepared for the installation of new pumping machinery and other improvements at the filtration plant, to cost about $90,000. An appropriation of this amount is available.

Washington, D. C.—Announcement is made by the Department of Commerce that the Mexican government is planning for the construction of 30 new radio plants, estimated to cost $250,000, including wireless equipment.

Danville, Va.—The Riverside & Dan River Cotton Mills have completed all arrangements for the erection of their proposed electric power plant for works service in this district. It is planned to start construction at once. The Aberthaw Construction Co., 27 School street, Boston, has the building contract.

Martinsville, Va.—Ford-Witt Furniture Co., organized with a capital of $500,000, plans to erect a factory which will be electrically-equipped. O. D. Ford is manager.

Wheeling, W. Va.—The former power plant of the Wheeling Electric Co. has been acquired by the C. B. Kimberly Co., for a consideration of about $18,000. The structure will be remodeled for general mechanical service in connection with coal and coaling operations.

Ayden, N. C.—The town council has preliminary plans under way for the installation of an electric street-lighting system. J. K. Quinerly is clerk.

Charlotte, N. C.—The Great Mountain Power Co., recently incorporated with a capital of $2,000,000, is planning for the construction of a hydroelectric power plant and distributing system in this section. The company is headed by H. S. Taylor, M. M. Crandall and G. B. Chapin.

Gastonia, N. C.—An issue of bonds to the amount of $285,000 was authorized by a recent ordinance, the money to be used for electric light and waterworks systems.

Greensboro, N. C.—E. C. Caldwell, Greensboro; and J. K. Caldwell, Galax, Va., have organized a company to build a large hydroelectric plant on the Dan river, near the Pinnacles of Dan, Va. The proposed plant will have an initial capacity of about 10,000 hp. and is estimated to cost $500,000, including dam construction and machinery. Plans for the plant are being prepared by Professor Seville, University of North Carolina, Chapel Hill, N. C.

Anderson, S. C.—The Flat Rock Light & Power Co., recently organized, is planning for the operation of a power plant in this vicinity. W. L. Hays is president, and John T. Howard, vice-president.

Valdosta, Ga.—Business men of this city have petitioned for a municipal lighting plant, bonds to the amount of $10,000 being already available for such a purpose. Address the mayor.

Miami Beach, Fla.—City has voted franchise to South Atlantic Telephone & Telegraph Co. to establish and extend telephone system on public highways.

NORTH CENTRAL STATES.

Adams Mills, O.—Plans are under way to construct power plant near this city to cost $23,000,000.

Akron, O.—Northern Ohio Traction & Lighting Co. has assured the Portage Lakes Improvement Association that a high tension light line would be run to the lakes next year. Many cottagers intend putting in electric lights and ranges during the winter.

Carrollton, O.—Ohio Power Co. will rebuild power line. Address general manager of the company at Canton.

Durand, Mich.—City will discuss the proposition of bonding for the rebuilding of city lighting and waterworks plant.

Grand Rapids, Mich.—The commission will change the boulevard light systems. City Manager Locke and Public Service Director Wagner favor substituting a modern installation for the present system.

Owosso, Mich.—F. J. York, engineer of Miller-York Co., Detroit, is going over plans for the boulevard lighting system to be installed here.

St. Clair, Mich.—The question of selling the power plant will be again submitted to vote. Present plant is so run down that it will require $70,000 to put it in condition to serve the people properly.

Union City, Mich.—Council has option on water power site and engineer is preparing estimates on the cost.

Bloomington, Ill.—Trimble and Folick have been awarded the contract for the electric wiring of the new high school at Wapella, Ill. This is the third contract to wire high school buildings which this firm has received, the other two being those at Downs and Leroy, Ill.

Waukegan, Ill.—Installation of an ornamental lighting system has met with approval. Address Mayor J. F. Bidinger, Chamber of Commerce.

Waukegan, Ill. — The Chicago, North Shore & Milwaukee Electric Railroad Co. has petitioned to extend its lines. A survey of certain streets has been completed by Chief Engineer Fallon of the North Shore company and the work of estimating the cost of proposed improvements is now well under way. The extension will cover several miles and will result in building up that part of the city north of Glen Flora along North avenue. Address the general manager of the North Shore railroad, 72 West Adams street, Chicago.

Grafton, Wis.—Jungers Stove Range Co. plans to erect stove factory on Main street in which several electric motors for power will be installed.

Sanborn, Wis.—Sanborn Telephone Co. is planning the purchase of the toll line of the Home Telephone Co. between here and Ashland.

Bemidji, Minn.—Contract for the installation of a "white way" lighting system for the city, to cost $32,595, was awarded to the Naylor Electric Co.

Curry, Minn.—A recent election authorized the issuance of electric light bonds.

Redwood Falls, Minn.—The directors of the Electric Telephone Co. have decided to purchase site for the erection of a central office.

Manchester, Ia.—The city is making a survey of its pumping station with a view to electrifying equipment. Address T. Wilson, clerk.

Oskaloosa, Ia.—Oskaloosa Home Telephone Co. will install a new switchboard at a cost of $40,000.

Butler, Mo.—Bonds to the amount of $65,000 have been voted by the city for the erection of an electric power plant. Address James T. Hull, Mayor.

St. Joseph, Mo.—St. Joseph Street Railway Co. will extend its lines a distance of ten blocks.

Kansas City, Mo.—An ordinance providing for the extension of ornamental street lights on Thirty-first street from the Paseo to Wabash avenue, was introduced in the lower house by Alderman Frank A. Griffin

of the Tenth ward. The ordinance was referred to the gas and light committee for a hearing.

Osawatomie, Kan.—Bonds to the amount of $85,000 have been voted for extending and improving the municipal water and light plant.

Campbell, Neb.—Henningson Engineering Co., National building, Omaha, has prepared plans for electric light plant. Address George O. Crilly, clerk.

SOUTH CENTRAL STATES.

Clarksville, Tenn.—Kentucky Public Service Co. plans to install electrical equipment in its new electric power plant to be located at Eleventh street and the Louisville and Nashville tracks.

Sheffield, Ala.—The city plans to establish "white way" system on Montgomery avenue. Address the mayor.

Louisville, Miss.—Town will vote on the question of issuing $36,000 electric light and power plant bonds. Address G. W. E. Bennett, clerk.

Shreveport, La.—The Louisiana Oil & Refining Co. is planning the rebuilding of its pumping plant at Moor Lingsport, near Shreveport, destroyed by fire, Aug. 23, with loss of about $25,000.

Dallas, Tex.—Dallas Power & Light Co. has been granted permission to issue $700,000 first mortgage bonds. Plant will be improved.

El Paso, Tex.—Southern Baptist Sanitarium will erect power and refrigeration plants. Address H. F. Vermillion, superintendent.

Paris, Tex.—A project has been launched to dam Pine creek and construct a natural reservoir with a capacity of nearly 4,000,000,000 gals. Bonds to the amount of $1,000,000 will be voted for same.

San Antonio, Tex.—The Syndicate Power Co. is arranging plans for the erection of its proposed new hydro-electric power plants on the Colorado river, in the vicinity of Marble Falls. The company has four sites in this locality, and will erect a series of electric generating stations with aggregate initial capacity of about 50,000 kw. The plants and equipment are estimated to cost close to $10,000,000. The company was recently organized with a capital of $20,000,000.

WESTERN STATES.

Miles City, Mont.—Eastern Montana Telephone Co. will construct 140 miles of line to connect with points south of here.

Salt Lake City, Utah—Bonneville Irrigation District has voted to issue $600,000 in bonds for the erection of an irrigation pumping system including a power house. It is planned to install in the pumping station two 500 hp. and two 900 hp. motors.

Bellingham, Wash. — The water board has voted to duplicate the motor and pump equipment at Maple street pumping station at a cost of $2800. Bids will be asked in the near future. Address commissioner of water board.

Priest Rapids, Wash.—The city has plans for a dam 90 ft. high and nearly two miles long that will develop more than 500,000 hp., and cost $20,000,000. Hugh Cooper will build the dam. A small part of the power will be used to irrigate several hundred thousand acres in Grant county and the balance for industrial and railway development.

Portland, Ore., (Rockwood)—Efforts are being made to secure electric lighting in the vicinity of Rockwood from the Portland Railway, Light & Power Co.

Sacramento, Cal.—Bids were received Sept. 2 by M. J. Desmond, city clerk, for furnishing transformers, sluice gates, centrifugal pumps, induction motors, intake and pumping works, electric crane, switchboards and force mains. ,

Villa Acuna, State of Coahuila, Mexico—Antonio Guijosa of Villa Acuna has been granted a concession by the Mexican government for the construction of an electric light and power plant here. Mr. Guijosa plans to install a plant of sufficient capacity to furnish power for operating irrigation pumping plants on both the Mexican and American side of the Rio Grande.

PROPOSALS.

Pittsburgh, Pa.—The Pittsburgh Hospital, Frankstown avenue and Washington boulevard, is taking bids for the erection of a new one-story power house at the institution, about 25 by 40 ft.

Buffalo, N. Y.—The State Hospital Commission, Albany, will receive bids up to Sept. 29 for additions at the power and heating plant at the State Hospital here, including the installation of new coal and ash-handling machinery. Louis F. Pilcher is state architect.

Taylorsville, Ga. — Taylorsville Light & Power Co. Capital $8000. Incorporators: Will M. Dorsey, A. R. McGinnis and C. O. Shaw.

Salyersville, Ky.—Salyersville Heat & Light Co. Capital $10,000. Incorporators: Saumel J. Patrick and others.

Fairfield, Mont. — Fairfield Telephone Co. Capital $25,000. Incorporators: E. A. Shilton and others.

Dickinson, N. D.—Western Brick & Telephone Co. Capital $25,000. Incorporators: W. L. Richards and others.

Charleston, S. C.—Oceanic Power Co. Capital $10,000. William Gregersen, president; William Tillinghast, secretary-treasurer.

Anderson, S. C.—Flat Rock Light & Power Co. Capital $5000. W. L. Hays, president; W. E. Eldor, secretary.

San Benito, Tex.—San Benito Electric Light & Power Co. Captial $50,000. Incorporators: C. G. Malott, R. B. Braeter and J. L. Lomax.

Perth Amboy, N. J.—Windman-Goldsmith, Inc. Capital $100,000. To manufacture electrical wiring specialties. President, D. Goldsmith; vice-president, Rose Goldsmith; treasurer, Philip Windman; secretary, Minnie Windman.

Bernardsville, N. J.—The A. K. W. Electric Co. Capital $125,000. To engage in general electric construction work. Incorporators: Clifford S. Amerman, H. J. Kessler and Charles E. Whitcomb.

Morristown, N. J.—The General Apparatus Co., Inc. Capital $25,000. To manufacture wireless apparatus. Incorporators: Milton B. Sleeper, Kimball H. Stark and Gordon C. Sleeper.

Jersey City, N. J.—The Weehawken Electric Welding Co. Capital $125,000. Incorporators: Charles B. Rodermond, Christopher M. Verdon and Henry J. Rodermond.

Frederick, Md.—Price Bros., Inc. Capital $100,000. To manufacture insulating materials, electrical appliances and equipment. Incorporators: Joseph B. Price, Osborne I. Price and Harry C. Hull.

Wilmington, Del.—The Cobb Electric Lantern Co. Capital $20,000. To manufacture electric lanterns and kindred specialties. Incorporators: T. L. Croteau, S. E. Dill and A. M. Hooven.

INCORPORATIONS.

Middleburg, Pa.—Washington Electric Service Co. Capital stock, $5000. To furnish electric light and power service. Incorporators: John F. Broom, A. W. Lee and John S. Fisher.

Port Deposit, Md.—Northern Maryland Electric Co. Capital stock, $250,000. To operate a local power plant and power service. Incorporators: John H. Ware, Jr., John S. Graybill, Jr., and J. Guy Eshleman.

Wilmington, Del.—Lyons Storage Battery Co. Capital stock, $500,000. To manufacture storage batteries and other electrical equipment. Incorporators: T. L. Croteau, M. A. Bruce and A. M. Hooven.

Wilmington, Del.—Interstate Electric Co. of Alabama. Capital stock, $360,000. To manufacture electrical equipment and supplies. Incorporators: M. L. Horty, S. L. Mackey and J. D. Frock.

Birmingham, Ala.—Interstate Electric Co. of Alabama. Capital $350,000. Incorporators: M. Horty, S. L. Mackey and J. D. Frock.

FOREIGN TRADE.

Copper Wire (33,576)—A mercantile firm in Turkey desires to purchase copper wire, plain and silvered, in large quantities. Correspondence should be in French. Quotations are requested c. i. f. Turkish port. Cash to be paid. References.

Electrical Equipment (33,554)—An agency association in the Netherlands desires to get in touch with manufacturers who are not yet represented in that country, with a view to securing exclusive agencies for all kinds of electric cable and wire, including electrolytic copper wire for overhead feeding lines. Reference.

Electrical Installations (33,591)—A miner in Spain desires to secure an agency for the sale of complete electrical installations for mines and mining machinery. Correspondence may be in English. References.

FINANCIAL NEWS

Comment on the Financial Outlook in the Electrical Industry, New Securities, Reports of Earnings, Dividends and Utility Stocks

Five Months' Showing of General Electric Co.

The report of the General Electric Co.'s earnings for the first five months of this year showed a manufacturing profit of 13.1%, subject to adjustments at the end of the year. In the following table sundry income and interest are estimated for the 12 months on the basis of the report for five months.

Estimated income account for 1920:

Sales billed	$275,000,000
Cost of sales, etc.	238,000,000
Manufacturing profit	36,025,000
Sundry income	5,856,000
Net income	41,881,000
Less interest	2,477,000
Available for dividends	39,404,000

The phrase "subject to adjustment at the end of the fiscal year," with which the General Electric Co. qualified its report on five months' earnings, is significant. Briefly, it means that federal taxes and a large depreciation have been charged out of gross before estimating manufacturing profit. Federal taxes last year were approximately $11,000,000 and annual depreciation in the last ten years has averaged more than 20% of book value, or over $10,000,000 of present book value. Thus, an allowance at an annual rate of at least $21,000,000 was probably made by the company in its five months' report. Consequently, fully $39,000,000 would be available for dividends, unless the company chooses to write off an exceptionally large depreciation.

Stock of General Electric Co. at 142 is selling to yield approximately 9.6%. The company pays a cash dividend of $8 a share and a stock dividend of 4%. Directors of the company have gone on record as favoring the indefinite continuance of the stock dividend. Earnings for many years past and prospects for the electrical industry in the future are sufficient assurance that the 8% cash dividend will not be cut. The company's huge write-offs have made book value far below actual value. This will unquestionably be the policy of the future.

Pacific Gas & Electric Co.

The statement of the Pacific Gas & Electric Co. for the six months ended June 30 shows surplus after charges, depreciation and federal taxes of $2,080,575, equal, after preferred dividends, to $3.57 a share on the common stock. Income account for the six months compares as follows:

	1920.	1919.
Gross	$16,374,736	$12,892,373
Expenses, taxes and depreciation	11,303,445	8,055,166
Interest, bonds, discounts, etc.	2,490,716	2,209,444
Additional depreciation	500,000	500,000
Preferred dividends	866,432	749,434
Common dividends	850,102	850,102
Surplus	364,041	528,227

Deposit for Sinking Fund of Northern States Power Co.

Northern States Power Co. has deposited with the Guaranty Trust Co. of New York, trustee, $200,000 par of its five-year-sinking fund convertible 7% gold notes, due Aug. 15, 1923, for cancellation in compliance with the terms of the sinking fund covering this issue.

Net Earnings of Allis-Chalmers for Six Months.

Allis-Chalmers Manufacturing Co. has declared a dividend of $1 on its common stock, payable Nov. 15 to stock of record Oct. 25. Three months ago an initial dividend of $1 was paid on the common stock. The regular quarterly dividend of $1.75 was declared on the preferred stock Oct. 15 to stock of record Sept. 25.

Declaration of a second quarterly disbursement on Allis-Chalmers common places the stock on a $4 annual basis. While the disbursement is termed "a dividend" by officials, interests in touch with the affairs of the company maintain that it is the intention to pay the $1 dividend each quarter. The present management is conservative and after having only cleaned up the accumulations on the preferred stock last winter, it is only natural that they hesitate to commit themselves to the payment of $4 annually on the common. Net earnings after taxes and available for dividends for the six months ended June 30 were $1,599,631. This is at annual rate of approximately $8 a share on the common stock.

Issue of Hartford Electric Light Co. Underwritten.

A syndicate consisting of Lee, Higginson & Co., Estabrook & Co., Boston, and Richter & Co., Hartford, Conn., has underwritten an issue of $5,000,000 ten-year 7% notes of the Hartford Electric Light Co. The notes are being offered at 95.68 and interest, yielding about 7.6%.

Utah Securities Corporation Subsidiaries.

	1920.	1919.
July gross	$ 668,377	$ 587,278
Net earnings	294,409	309,094
Twelve months' gross	7,986,930	7,062,694
Net earnings	3,845,574	3,685,233

Arkansas Light & Power Co.

	1920.	1919.
July gross	$ 151,557	$ 106,490
Net after taxes	33,081	32,586
Total income	38,762	32,818
Surplus after fixed charges	26,891	22,951
Balance after preferred dividends	18,951	15,076
Twelve months' gross	1,030,601	760,556
Net after taxes	224,551	217,907
Total income	263,993	227,472
Surplus after interest charges	138,033	102,094
Balance after preferred dividends	43,186	15,761

Holding Company for Electrical Securities Corp. Reduces Capital.

The Bank fuer Elektrische Unternehmungen, of Zurich, Switzerland, holding company for the Electrical Securities Corp., has reduced its capital to 25% and changed its bonds to 6% cumulative preferred shares, owing to heavy losses suffered with depreciated German mark and Italian lire.

Dayton Power & Light Co.

	1920.	1919.
July gross	$ 277,932	$ 202,835
Net after taxes	67,796	66,517
Total income	69,859	70,313
Surplus after charges	27,608	19,382
Balance after preferred dividends	10,244	3,127
Seven months' gross	2,068,142	1,614,625
Net after taxes	570,995	593,293
Total income	591,317	613,250
Surplus after charges	266,802	307,443
Balance after preferred dividends	145,726	197,621

Dividends.

Cities Service Co. has declared the nineteenth monthly dividend of 40.75 cents on the Bankers shares, payable Oct. 1 to stockholders of record Sept. 15. Distribution on these shares made Sept. 1 was made to 12,221 holders of record, an increase of 6683 holders of record since Jan. 1, 1920, and a gain of 8744 holders of record over the distribution made Sept. 1, 1919.

Arkansas Valley Railway Light & Power Co. has declared its regular quarterly dividend of 1.75% on the preferred stock, payable Sept. 15 to stockholders of record Aug. 31.

Oklahoma Gas & Electric Co. has declared its regular quarterly dividend of 1.75% on the preferred stock, payable Sept. 15 to stockholders of record Aug. 31.

Muskogee Gas & Electric Co. has declared its regular quarterly dividend of 1.75% on the preferred stock, payable Sept. 15 to stockholders of record Aug. 31.

WEEKLY COMPARISONS OF CLOSING-BID PRICES OF SECURITIES OF LEADING ELECTRICAL COMPANIES.

Quotations furnished by F. M. Zeiler & Co., Rookery Bldg., Chicago.

Public Utilities—	Div. rate. Per cent.	Bid Aug. 31.	Bid Sept. 7.
Adirondack Electric Power of Glens Falls, common	6	13	13½
Adirondack Electric Power of Glens Falls, preferred	6	71	70
American Gas & Electric of New York, common	10+extra	91	91
American Gas & Electric of New York, preferred	6	33	34
American Light & Traction of New York, common	..	111	110
American Light & Traction of New York, preferred	6	81	81
American Power & Light of New York, common	4	41	45
American Power & Light of New York, preferred	6	65	63
American Public Utilities of Grand Rapids, common	..	3	4
American Public Utilities of Grand Rapids, preferred	7	12	13
American Telephone & Telegraph of New York	..	97	98
American Water Works & Elec. of New York, common	..	2	2
American Water Works & Elec. of New York, particip	7	4	4
American Water Works & Elec. of New York, 1st preferred	..	38	38
Appalachian Power, common	..	1	1
Appalachian Power, preferred	7	15	14
Cities Service of New York, common	+extra	292	290
Cities Service of New York, preferred	6	65	65
Commonwealth Edison of Chicago	8	100	101
Comm. Power, Railway & Light of Jackson, common	..	15	16
Comm. Power, Railway & Light of Jackson, preferred	6	36	36
Federal Light & Traction of New York, common	..	6	6
Federal Light & Traction of New York, preferred	..	39	39
Northern States Power of Chicago, common	..	29	30
Northern States Power of Chicago, preferred	ex.div.7	74	74
Pacific Gas & Electric of San Francisco, common	..	46	47
Public Service of Northern Illinois, Chicago, common	7	65	65
Public Service of Northern Illinois, Chicago, preferred	6	83	83
Standard Gas & Electric of Chicago, common	..	13	12
Standard Gas & Electric of Chicago, preferred	6	35	35
Tennessee Railway, Light & Power of Chattanooga, common	..	1	1
Tennessee Railway, Light & Power of Chattanooga, preferred	6	2	2
Western Power of San Francisco, common	..	18	18
Western Union Telegraph of New York	extra	85	86
Industrials—			
Electric Storage Battery of Philadelphia, common	4	120	120
General Electric of Schenectady	8	141	141
Westinghouse Electric & Mfg. of Pittsburgh, common	7	46	47